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**Perceptions of Registered Nurses Sanctioned by a Board of Nursing:
Individual, Health Care Team, Patient, and
System Contributions to Error**

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System Contributions to Error**

by

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Dedication

I would like to dedicate this dissertation to the memory of the nurses in my family: my mother, Christine Thomas, RN; my grandmother, Claire Clement, RN; and my aunt, Betty Thomas, RN. Without your nurturing, pioneering spirit and intellectual drive, I would not have this path laid out before me. I would also like to dedicate this dissertation to my father, Robert Thomas, for his lifelong approach to leadership, success, and appreciation of all of life's ironies that has continually inspired me and for always recognizing and trusting my ability to succeed.

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**Perceptions of Registered Nurses Sanctioned by a Board of Nursing:
Individual, Health Care Team, Patient, and
System Contributions to Error**

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The University of Texas at Austin, 2007

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Errors in health care are one of the leading causes of death and injury in this country, requiring new methods for evaluating and promoting quality in health care services. Concern for patient safety, the foundation for quality services, has prompted national initiatives to examine the most basic premise for health care providers: Do no harm to the patient. Few of these initiatives have examined errors from the perspective of those who have been sanctioned for their errors. This descriptive, exploratory study utilized a survey methodology to examine the perceptions of 62 registered nurses (RNs) who had been sanctioned by a board of nursing to ascertain categories of practice errors and identify individual, health care team, patient, and system threats that contributed to an error and/or patient harm. The Threat and Error Management Model (TEMM) was utilized as a framework for examining the phenomena that promote or hinder patient safety. Using a modified version of the Taxonomy of Error Root Cause Analysis of Practice-Responsibilities (TERCAP) instrument, sanctioned RNs selected types of errors associated with a breakdown in their nursing practice. In addition, they identified factors that contributed to their errors, including individual, health care team, patient, and system

threats. Associations between the levels of patient harm and types of error were examined. Two open-ended questions provided an opportunity for the participants to describe changes in their practice since the error event. System and health care team factors were the most common items selected as contributing to the error events, while individual factors were the least often selected items. Two types of errors, clinical evaluation and attentiveness/surveillance, were significantly related to the level of harm to patients. Given the opportunity to discuss individual factors through open-ended questions, responses were comprehensive and many were related to issues with trust. Recommendations for nursing theory, policy, practice, education, and research are reviewed.

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Chapter 1: Introduction to the Study

STUDY PURPOSE

The purpose of this descriptive, exploratory study was to examine the perceptions of registered nurses (RNs) who had been sanctioned by a board of nursing to ascertain categories of practice errors and identify individual, health care team, patient, and system threats that contributed to an error and/or patient harm. The Threat and Error Management Model (TEMM) was utilized as a framework for examining the phenomena that promote or hinder patient safety. Using a modified version of the Taxonomy of Error Root Cause Analysis of Practice-Responsibilities (TERCAP) Instrument, sanctioned RNs selected types of errors associated with a breakdown in their nursing practice. In addition, they identified factors that contributed to their errors, including individual, health care team, patient, and system threats. Associations between the levels of patient harm and types of error were examined. Understanding the perspective of these nurses should provide a close look at the error process and support the development of new knowledge about the multidimensional contributions to errors.

BACKGROUND AND SIGNIFICANCE OF THE STUDY

Errors in health care are one of the leading causes of death and injury in this country, requiring new methods for evaluating and promoting quality in health care services (Agency for Healthcare Research and Quality [AHRQ], 2000, 2001; Institute of Medicine [IOM], 2000, 2004). Concern for patient safety, the foundation for quality services, has prompted national initiatives to examine the most basic premise for health care providers: Do no harm to the patient. Instances of injuries and death remain high and costly even though health care indices of quality have been used extensively in the health

care arena (AHRQ, 2000; IOM, 2000, 2001, 2004; Leape, 1997). For example, based on an extrapolation of all hospital admissions in the United States in 1997, it is estimated that there are between 44,000 and 98,000 deaths annually as the result of medical errors (IOM, 2000). Furthermore, the estimated cost of adverse events—including lost income, lost household production, disability, and health care costs—totaled between \$17 billion and \$29 billion, with health care costs constituting more than half the expenditures (IOM, 2000). Medication errors are a type of medical error, and evidence reveals that they are costly. For example, one study suggests that nearly 2% of patients admitted to a hospital were involved in a preventable adverse drug event, resulting in an average cost of \$4,700 per admission or \$2.8 million a year for a 700-bed teaching hospital (IOM, 2000). Evidence also identifies surgical errors as a problem. In a study conducted to estimate the costs of errors in surgeries, medical claims for 22,477 surgeries in 1,725 hospitals were reviewed for the AHRQ's Patient Safety Indicators, which identifies 14 types of preventable adverse events. Using multivariate analysis, the researchers found that the average difference in cost between those patients who had a potentially preventable adverse event and those who did not was an additional \$35,617. Of these costs, 20% (\$6,998) was attributed to the actual adverse event. In addition, patients who experienced adverse events were 3% more likely to die within 90 days than those without adverse events (Encinosa & Hellinger, 2005).

The depth and breadth of the health care errors is such that national and state policy initiatives are being implemented to establish a regulatory framework for solutions. At the state level, coalitions between the health care industry, professional associations, and patient advocacy groups are being formed to address common goals and strategies to promote patient safety and reduce error rates (Comden, 2002). Legislators at the national level are also responding. In July of 2005, President Bush signed into law the

Patient Safety and Quality Improvement Act of 2005 (GovTrack.us, 2005). This law mandates the establishment and maintenance of a network of standardized patient safety data centers to serve as a repository for confidential information about health care errors in order to analyze and promote new knowledge about the problem. Called Patient Safety Organizations (PSOs), the purpose of these data centers is to compile anonymous data to analyze trends and make recommendations regarding common factors involved in errors. Organizations can report errors to the PSOs with non-identifiable provider information. Many believe that the anonymity of the data will decrease barriers to reporting and subsequently provide more complete information to enhance methods to decrease medical errors (Kristin Hellquist, personal communication, April 10, 2006). The new law mandates that a report to Congress is made each year to inform policy makers of research findings that may provide direction on methods to mitigate the problem (GovTrack.us, 2005).

Historically, the health care industry investigated error commission within the context of quality improvement and risk management. Although quality-control activities have been incorporated into the majority of health care organizations, the industry has been resistant to examining the frequency and severity of medical errors and adverse events (RAND Corporation, 2005). Concerns about legal liability, the complexity of the problem, and lack of scientific evidence about the etiology and resolution to medical errors contribute to this resistance (AHRQ, 2000, 2001; Cohen, 2000; IOM, 2000, 2004; RAND Corporation, 2005; Spath, 2000). However, with the release of the 2000 IOM report *To Err Is Human*, which provided evidence outlining the considerable costs of medical error, endeavors to improve patient safety were propelled to the forefront of a national political and research agenda. The IOM report issued a call to action and outlined four strategies to prioritize patient safety initiatives, including setting a national

agenda to develop the leadership and knowledge needed for resolution of the issue; instituting a national reporting system for identification and analysis of medical errors; establishing standards for health care providers and organizations with oversight and input from regulators, accrediting bodies, and consumer groups; and implementing cultures of safety within health care systems (IOM, 2000; RAND Corporation, 2005).

These policy initiatives reflect a macro approach to the issue of health care errors and patient safety. A micro approach reflecting the patient/family perspective also should be examined. Surveys of health care consumers about their experiences with errors in their health care have produced alarming results. The National Patient Safety Foundation found that 42% of respondents to a survey it conducted reported being affected by a health care error, either personally or through a friend or relative. Of these respondents, 32% indicated that an adverse event resulting from the error had a permanent, negative effect on the patient's health (AHRQ, 2000). Another survey conducted by the Kaiser Foundation (2004) found that 48% of the 2,012 respondents reported concern for themselves and their families about the safety of the medical care received, while 55% indicated dissatisfaction with the quality of health care in this country. Studies such as these provide evidence that consumers are recognizing errors in their health care experiences and also lack trust and confidence in the system's ability to provide safe services (Serembus, Wolf, & Youngblood, 2001).

These data suggest that consumers are concerned about medical errors. What have representatives of the health care industry done to respond to the issue? Historically, because of fears about litigation and liability, the health care industry's legal or risk management departments often advised actions that were not completely open and transparent. For instance, legal counsel would advise against the disclosure of an error to the patient because of concerns about litigation (Scott, 2004). However, recent studies

about liability and disclosure of errors are beginning to appear in the literature, and some progress has been made in implementing more transparent policies to meet patient safety standards (Devers, Pham, & Liu, 2004; Leape & Berwick, 2005; Scott, 2004). In a study involving interviews with hospital leaders (Devers, Pham, & Liu, 2004), researchers found that the Joint Council on Accreditation of Healthcare Organizations' (JCAHO) Patient Safety Standards released in 2001 have spurred hospitals to implement standards regarding error disclosure information given to patients. Likewise, hospital leaders have acknowledged the impact of patient safety standards developed by other groups such as purchasers of health care, national and state professional associations, and safety foundations. One of these has taken the lead in developing patient safety standards. The Leapfrog Group, composed of employers, seeks to alert America's health care industry to the concept that customer value, safety, and quality care will be acknowledged and rewarded (Leapfrog Group, 2007). As a major payer and player in the health care industry, this group has made significant progress in the implementation of patient safety standards.

The literature reflects that health care providers and their employers should be cognizant of patient and professional mandates that require a transparent, ethical approach to identifying and resolving medical errors (Gallagher & Levinson, 2005; Wilson & McCaffrey, 2005; Wojcieszak, 2005). Patients and their families want to know about any errors that occur in their care, including how and why they happened and what is going to be done to remedy the problem (Wilson & McCaffrey, 2005). They want an honest, ethical, and accountable response to the error. This supports an approach to error resolution that incorporates honesty, a willingness to reveal, transparency, and making amends when possible (Crigger, 2004; Janove, 2006).

However, there are some issues with this approach that must be discussed. Health care providers may be fearful of personal and professional repercussions of an error. Barriers to an ethical response to errors include concerns about litigation, liability, and licensure restrictions. Developing proactive guidelines through discussions with colleagues and employers should support the individual health care practitioner in acknowledging and reporting mistakes (Gallagher & Levinson, 2005).

In addition to concern about patients and families who suffer from adverse events, there should be an acknowledgment of the health care provider involved in the commission of the error. Health care providers may also suffer as a result of their errors, especially when adverse events occur (Serembus et al., 2001). Health care providers are licensed to promote safe, quality health care in a culture that expects perfection. When something goes wrong, such as an error in the performance of their duties, health care providers typically feel a personal and professional responsibility. Health care providers who have committed errors report feelings of responsibility, guilt, and depression and memories that stay with them for many years (Serembus et al., 2001).

Although the problem of errors in health care affects all health care providers, this study is concerned with practice errors made by RNs. The role of the nurse in promoting patient safety is both paramount and precarious. It is paramount in that of all the members of the health care team, nurses are with the patient longer and are more involved in the patient's ongoing care. This relationship with the patient is also precarious in that it places the nurse at higher risk of making medical errors (IOM, 2004). Identifying the phenomena that contribute to nursing errors is in the beginning stages of research, and this study promotes new knowledge by gaining the perspective of nurses who have been involved in practice errors.

RNs have a contract with society to provide human caring without self interest and with moral and ethical integrity (Sullivan & Benner, 2005). Through the educational process and subsequent professional development, nurses learn how to comply with this contract and the associated standards. Boards of nursing play a critical role in providing assurance that nurses meet these standards through the development of binding requirements for practitioner competence and remediation.

The literature suggests that we live in a culture where health professionals are expected to be perfect with no instances of error (IOM, 2004; Kaiser Foundation, 2001). Licensing boards are viewed by some as reinforcing the myth of clinical perfection and, in fact, the IOM has recommended that nursing regulatory boards across the country develop processes for distinguishing errors caused by human factors from errors caused by intentional misconduct and negligence (IOM, 2004). Because state boards of nursing have substantial data about nursing errors, exploring their data to investigate new models related to the nurse's role in the commission of medical errors is timely. Because this study utilizes the TEMM as a framework and the modified TERCAP instrument as a data collection tool, the perspectives of RNs who have been sanctioned by a board of nursing will enhance an understanding of personnel who work most closely with patients and are most vulnerable to error commission.

RESEARCH QUESTIONS

- What is the demographic profile of RNs sanctioned by the BNE?
- What are the incidences of individual, health care team, patient, and system threats and types of errors as reported by sanctioned nurses?
- What are the incidences of the level of harm to the patient as reported by sanctioned nurses?

- What relationships exist between the types of errors and the level of harm to the patient as reported by sanctioned nurses?
- What changes in practice do RNs sanctioned by the BNE describe after the error event, and what suggestions do they have for other nurses in preventing error events?

CONCEPTUAL FRAMEWORK

There are many definitions of patient safety, and most focus on the prevention and mitigation of errors during the delivery of patient care (Chang, Schyve, Croteau, O’Leary, & Loeb, 2003; IOM, 2000; National Patient Safety Foundation, n.d.; Powell, Haskins, & Sanders, 2005). However, the prevention and mitigation of errors and their relationship to patient safety has not been fully explored, and a framework for research and theory development is needed (IOM, 2001, 2004). To develop effective programs that promote best practices, reduce errors, and prevent iatrogenic injury to or the death of patients, theoretical questions and propositions should be examined (Reed, Shearer, & Nicoll, 2004). Using a theoretical approach to define and differentiate the phenomena will assist researchers in determining what questions to ask and what methods to use (Meleis, 1997).

The investigation of phenomena that promote or hinder patient safety is relatively new to the health care industry (AHRQ, 2000; Helmreich, 2000a; IOM, 2000; Mark, Hughes, & Jones, 2004; Helmreich & Sexton, 2004). The development of this knowledge lends itself to exploratory research in patient safety. Consequently, studies may be descriptive in nature and applicable for a starting point in hypothesis generation or theory development (Polit & Beck, 2004). Pertinent to a framework for safety in nursing would be the inclusion of models or theories derived from behavioral science, human factor analysis, high-reliability analysis, and organizational analysis (IOM, 2004).

Of interest and importance for this study is an exploration of a model derived from Human Factors Theory that has been utilized in the aviation industry and is currently being studied for its applicability to health care (IOM, 2004; Helmreich, 2000a, 2000b; Thomas & Houston, 2005; Thomas, Sexton, & Helmreich, 2004). Human Factors Theory is concerned with the human interface with technology, tools, automation, and complex systems (National Aeronautics and Space Administration [NASA], 2003). Robert Helmreich, a human factors expert, has been utilizing this framework to study safety in aviation and, more recently, safety in health care. His research has been pivotal in the development of a model that has promoted the aviation industry's success in safety. Because of this success, Helmreich's TEMM is worth exploring for applicability in the health care industry and more specifically in the practice of nursing.

Threat and Error Management Model

In the early 1980s, Helmreich and his research team developed the Crew Resource Management (CRM) program to teach pilots, air traffic controllers, and flight attendants an approach to error reduction. Principal components of the program included a systems approach to safety, team building to promote communication, an evaluation of human factors such as fatigue and stress in errors, and lastly the influences of the organizational culture on the perception and resolution of errors (Helmreich, 1996). In an effort to refine the CRM program, Helmreich, influenced by the research of James Reason, changed the focus of CRM from error avoidance to error management, acknowledging that human error is ubiquitous and inevitable (Helmreich, 1996; Helmreich, Willhelm, Klinec, & Merritt, 2001). This shift from avoidance to management reflected an acknowledgement of the limitations (threats) of both humans and systems in error commission. Error management was developed as a mechanism to mitigate the ever-present threats that occur in highly complex systems. Helmreich used

inductive methods to develop the TEMM, including confidential surveys of pilots, non-punitive incident reporting systems, and direct observation of cockpit crews (Helmreich, 2000a). Data were taken directly from pilot-identified issues and pilot-derived terminology. This inductive process differentiates the TEMM from Human Factors Theory, which utilizes a cognitive modeling approach (Harper & Helmreich, 2003).

Acknowledgement of the aviation industry's success in using the model to identify, manage, and reduce errors was noted by the members of the IOM, who directed the health care industry to take note (IOM, 2000). Although originally applied in a different context, the model is unusually broad in its coverage of a wide range of factors that directly or indirectly play into errors and mishaps. The model is potentially valuable for its holistic and metaphorical approach in the quest for cause and effect or the convergence of factors that produce undesirable health care outcomes or errors. Accordingly, this study utilizes Helmreich's model for its heuristic value in identifying factors that might otherwise go undetected in the health care arena.

Appendix A depicts the relationship between the major constructs within the TEMM. Appendix B is a more detailed picture of the model and provides concepts to describe each construct. The model is recursive and intertwined, reflecting the dynamic nature of the phenomena of error (Helmreich, 2000b). There are two basic processes in the model. The first process is an analysis and categorization of errors leading to the event. This component provides the analysis of errors that is customary in reviewing morbidity and mortality. The second process consists of the analysis of the threats that contributed to the error and the behaviors utilized to manage the threat and error. Every error may resolve itself, be successfully or unsuccessfully managed, or precipitate further errors (Helmreich, 2000a, 2000b; Harper & Helmreich, 2003).

Latent and Overt Threats

Helmreich (2000a, p. 784) defines threats as “factors that increase the likelihood of errors.” The TEMM establishes that there are latent or hidden threats and overt or immediate threats. Latent threats, as identified in the model, include national, organizational, and professional culture; scheduling; and vague policies. Overt threats include environmental, organizational, individual, team/crew, and patient factors. Gaining an understanding of latent and overt threats is clearly important for exploring patient safety and the relationship between error and safety. This is because, historically, the evaluation of errors has been focused on the more visible aspect of error commission, such as the competency or liability of an individual practitioner, and not on the less obvious factors that present threats to patient safety. James Reason (1990) was one of the first cognitive psychologists to propose that it is latent factors that most often contribute to error commission. In the TEMM, an evaluation of the context surrounding the error contributes to an analysis of latent threats, including expected and unexpected threats (Helmreich, 2000b). Latent threats are hidden in an organizational system and become visible only when combinations of factors break down the system’s defenses (Reason, 2000). The TEMM reiterates that these threats are existing conditions that are not easily identifiable and predispose situations leading to errors (Helmreich, 2000b). Within a health care system, latent threats are usually influenced by management and include factors such as resource allocation, culture, and leadership. Aiken’s research on the effect of staffing on nursing errors is an example of how a latent threat can impact patient safety (Aiken, Clarke, Sloane, Sochaiski, & Silber, 2002).

Overt threats, on the other hand, are very apparent and include factors that are visible, obvious, and very close to the frontline worker (IOM, 2004). Because overt threats are more apparent than latent threats, they are typically the focus of error

management. Individual practitioner factors that may lead to errors include cognitive mistakes, fatigue, and, rarely, lack of regard or concern. Environmental factors that could become overt threats include the architectural layout of a hospital unit, increased patient admissions due to seasonal variations, and inadequate team communication.

Error

In the TEMM, errors are defined as “what was done wrong” (Helmreich, 2000b). This is a simplistic definition, yet it is the simplicity itself that facilitates utilization for many different types of environments. The TEMM portrays a process of error events that describes how the error progressed. For example, “error detection and response” reflects the level of the health care practitioner’s awareness of the problem. “Induced patient state” reflects how the patient is affected by the error. “Management of the patient state” describes what was done to monitor and oversee the process that initiated or facilitated the error. “Adverse” and “inconsequential” outcomes describe how the error affected the patient.

Threat and Error Management Strategies and Countermeasures

Observational data of 3,800 flights provided evidence that specific management behaviors are essential in helping recognize and manage threats and errors (Thomas, 2000). Helmreich (1998, 2000b) uses the phrase “threat and error management” to describe how mistakes are handled. Helmreich developed the CRM to implement certain behaviors to manage and counter threats and errors (Helmreich, 1996). These activities, called behavior markers, include briefings, monitoring, and cross-checking that are pertinent to the aviation industry.

Threat and error management strategies such as behavior markers provide deliberate, evidence-based activities that help to counter the effects of error commission.

Specifically, error management involves the use of data to understand the etiology of error, outline appropriate behaviors to reduce the incidence of error, and minimize the consequences of errors that do occur (Helmreich, 1998).

Applicability to Health Care and Patient Safety

The TEMM is being utilized in health care because of the belief that the model can assist in understanding the nature and management of errors in a complex environment (Helmreich, 2000b). Helmreich hypothesizes that the model will promote an understanding of how threats, errors, and their management interact and affect patient safety outcomes (Helmreich, 2000a). Research is underway to further develop the model. Thomas and his colleagues at The University of Texas are utilizing the model to evaluate whether behavioral markers that counter threats and errors in the aviation industry are pertinent to the health care industry (Thomas & Helmreich, 2002; Thomas et al., 2004). In addition, the model is being utilized at medical schools and hospitals as a framework for patient safety research (Helmreich, 2000a; Health Alliance Safety Partnership, 2005; Musson & Helmreich, 2004; Sexton, Thomas, & Helmreich, 2000; Thomas et al., 2004; Helmreich & Sexton, 2004).

In this study, the model was used to direct the research questions, guide data collection, and direct data analysis in ascertaining individual, health care team, patient, and system threats relating to nursing errors as perceived by nurses involved in those errors. Examining these variables is important because recent patient safety literature de-emphasizes individual contributions to errors and prioritizes a focus on the examination of latent threats through systems analysis (Helmreich, 2000a; IOM, 2000, 2004; Reason, 1990). However, Benner argues that a systems approach to error resolution cannot replace professional judgment and good practice found within the individual health care professional and the health care team (Benner, Malloch, Sheets, Bitz, Emrich, & Thomas,

2006). This thinking is mirrored by the Citizen Advocacy Center (CAC), a not-for-profit organization composed of public members who serve on health care regulatory and oversight agencies, which has prioritized provider competency and the effect on patient outcomes such as safety (2000).

In the TEMM, individual as well as health care team, patient, and organizational factors are all included in the model. This provides an opportunity to examine all four variables. Of importance for this study is the availability of an instrument specifically developed for capturing nursing errors that utilizes a framework of similar concepts identified as threats in the TEMM. This instrument is the TERCAP and was developed by the National Council of State Boards of Nursing (NCSBN). By modifying the TERCAP for utilization in this study, core concepts within the TEMM will be identified by nurses who have been involved in nursing practice errors that led to a sanction from a board of nursing.

By using the TEMM and the TERCAP, this study may provide evidence that informs pertinent stakeholders about the relationship between types of errors and patient outcomes. Further studies could develop into a full program of research. For instance, though not explored in this study, one might investigate the types of behavioral markers that are important for the nursing profession. Once identified, these behaviors could provide a template for the establishment of programs and protocols that are consistent, transparent, and standardized. This type of research is aligned with the mission of the AHRQ, which is to use evidence-based data for the development of guidelines, performance measures, educational programs, and other strategies to affect safety and health care quality (RAND Corporation, 2005).

Information about types of nursing errors could also guide boards of nursing in developing remediation strategies that promote individual competency and safe practice.

Information about system threats could provide direction to health care organizations in the development of system-wide quality improvement activities. Examining relationships between overt and latent threats and patient outcomes will also contribute to further theory development in patient safety. In light of the terrible loss of human life and well-being along with the fiscal impact of this problem, broadening and refining research into medical errors and patient safety is necessary.

STUDY DEFINITIONS

Sanctioned registered nurse: A licensed RN who has been reported to a board of nursing and has received a disciplinary order because of a nursing practice error. Texas Nursing Practice Act, Section 301.452, Grounds for Disciplinary Action.

Error: A breakdown in an RN's practice that has been investigated by the Texas Board of Nurse Examiners (BNE) and found to have violated the Nursing Practice Act. Texas Nursing Practice Act, Section 301.452 (b)(10), (b)(13), Grounds for Disciplinary Action and Unprofessional Conduct, Rule 217.12 (1)(4). For the purposes of this study, it is the items found within the nursing error taxonomy of the modified TERCAP.

Individual threat: Individual factors that increase the likelihood of error. For the purposes of this study, it is the items in the modified TERCAP that address the individual nurse's factors that contributed to the error.

Health care team threat: Factors within the health care team that increase the likelihood of error. For the purposes of this study, it is the items in the modified TERCAP that address health care team factors related to the error.

Patient threat: Factors within the patient that increase the likelihood of error. For the purposes of this study, it is the items in the modified TERCAP that address the characteristics of the patient involved in the error.

System threat: Factors within the system that increase the likelihood of error. For the purposes of this study, it is the items in the modified TERCAP that address system factors related to the error.

Patient outcome: Includes what happened to the patient and any temporary or permanent impairment of the physical, emotional, or psychological function or structure of the body or pain that required intervention. For the purposes of this study, it is the items in the modified TERCAP that address patient outcomes.

ASSUMPTIONS

Based on the TEMM, assumptions stem from the relationships among the model's concepts and provide guidance for the research study. First, it is assumed that errors occur while caring for patients and that RNs are among the health care providers who make these errors. It is also assumed that the RNs in the sample who received a sanction from the board of nursing did make an error while caring for a patient. The third assumption is that factors exist that pose threats to patient safety and may contribute to error commission by the individual RN, the health care team, the patient, and the health care system. The fourth assumption is that errors can be managed by identifying individual, system, health care team, and patient contributing factors. The fifth assumption is that the analysis of errors will broaden knowledge about error commission, which may promote patient safety. Finally, it is assumed that RNs wanted to participate in the survey, that they were willing to share their thoughts, and that recall of the error events were as the respondents perceived them.

LIMITATIONS

The study utilized a unique group of RNs who had been sanctioned by a board of nursing and thus does not represent the total population of RNs. Furthermore, the results

are also limited in generalizing to the population of sanctioned RNs because the sample is composed of participants who reside in one state in the United States. These factors limit the findings of the study and may not be generalized to the general RN population (Polit & Beck, 2004). Another limitation is that not all errors are reported to the BNE, so the study's sample does not include everyone who has committed a practice error.

This study is a survey of RNs who have been disciplined by the BNE and thus may have experienced shame or embarrassment among their colleagues (IOM, 2004). Consequently, they may have responded in the survey by minimizing their contribution to the error or by maximizing external factors such as systems issues. In addition, the RNs may have wanted to put the disciplinary experience behind them and may not have responded to the survey, thus limiting the response rate. Survey research seeks to gain accurate information from respondents about the researcher's area of interest. However, the respondent's perception may not have been objective or accurate and may have been self-serving (Streiner & Norman, 2004). For example, Streiner & Norman (2004) state that many respondents give socially desirable responses. Finally, recall bias may have affected some of the participants' responses because the disciplinary action occurred up to two years before the survey was sent (Streiner & Norman, 2004).

Chapter 2: Review of the Literature

INTRODUCTION

Research regarding patient safety and medical error began to emerge in the literature in the late 1990s and currently is prominent (AHRQ, 2000; Helmreich, 2000a; IOM, 2000; Mark et al., 2004; Helmreich & Sexton, 2004). Although total quality management programs were fully incorporated in health care organizations by 1993, the industry was resistant to research on the frequency and severity of medical errors (RAND Corporation, 2005; Reason, 1997; Scott, 2004). Concerns about legal liability, the complexity of the problem, and a lack of scientific evidence about the etiology and resolution of medical errors were identified as factors that impeded research into error commission (AHRQ, 2000; Cohen, 2000; IOM, 2000, 2001, 2004; National Quality Forum [NQF], 2005; Spath, 2000). A culmination of events in the mid to late 1990s prompted a change in the contextual issues surrounding patient safety and, consequently, a national and comprehensive endeavor began to address errors in health care. The IOM's sentinel report released in late 1999, *To Err Is Human*, provided a template for further IOM reports that critiqued the depth and breadth of issues related to quality in health care and its effect on medical error (IOM, 2000, 2001, 2004). With the release of the first IOM report, the Healthcare Research and Quality Act passed, charging the AHRQ with the research and promotion of patient safety and providing a budget of \$50 million (RAND Corporation, 2005). The Quality Interagency Coordination task force was also established for the purpose of ensuring the coordination of all federal health care agencies to improve quality of care, including improving patient safety (RAND Corporation, 2005). During this time, federal agencies involved in health care, beginning with the U.S. Department of Veterans Affairs, began to test models used in the aviation industry that provided

direction for gaining new knowledge about the etiology and commission of errors. This study also utilized a model that originated in the aviation industry. Investigating the TEMM may provide direction for application and future research in the health care industry.

To gain an understanding of the phenomena involved in error, a search of the literature was conducted in the Cumulative Index to Nursing and Allied Health Literature database (CINAHL), Medline, and Proquest Digital Dissertation; publications of the IOM and the AHRQ; and other regulatory, business, and public administration publications. Key words used in the search included *threats*, *errors*, *patient safety*, and *error classification*. After an initial review of the literature, only articles addressing scientific study and theory-based manuscripts were aggregated into several themes. Therefore, the review of the literature will first provide a discussion of what is known about error and its classification. Secondly, the review will provide an analysis of research related to threats to patient safety such as individual health care practitioner threats, health care team threats, patient threats, and system threats.

TAXONOMIES AND CLASSIFICATION SYSTEMS OF HEALTH CARE ERRORS

The development of taxonomies and categories of errors is essential to promote a standardized language that provides clarity, specificity, and differentiation, thus facilitating measurement of the concepts. This process provides the groundwork for the development of research by providing specificity and definitions of concepts (LoBiondo-Wood & Haber, 1986). The first step in this process is to describe and summarize information about errors, thereby reducing it to smaller, more meaningful sets of data (Munro, 2001). A clear, specific description and summarization of errors will promote an understanding of the phenomena and distinguish the concept of error from other similar concepts or phenomena (Blalock, 1982). Although the review of the literature reveals

many criteria appropriate for developing and evaluating patient safety classification systems, certain factors should be present in all systems. These include clear definitions, a description of the “who, what, when, and where” of the event, an evaluation of process and outcome measures, and an error classification section (AHRQ, 2001; Chang, Schyve, Croteau, O’Leary, & Loeb, 2005; Lilford, Mohammed, Braunholtz, & Hofer, 2003; Nebeker, Hurdle, Hoffman, Roth, Weir, & Samore, 2002; Wilson, Dowd, & Kralewski, 2005).

There are several systems that identify taxonomies or categories of error. The oldest system found in the literature is the Advanced Incident Monitoring System (AIMS), commonly known as the Australian Taxonomy. The AIMS was developed by the Australian Patient Safety Foundation (APSF) to “collect, classify, analyze, and learn” about iatrogenic harm (APSF, 2003, p. 1). The AIMS was developed in 1987 by the APSF when it determined that there was no comprehensive source of information about “things that go wrong” in health care (Runciman, 2002, p. 246). The AIMS evolved over the years to include the development of the Generic Reference Model, which contains approximately 12,500 categories to comprehensively classify national and regional events. These categories differentiate the events by capturing contributing factors, reviewing salient features, and placing the events in context (Runciman). In 2000, the AIMS was revised to expand its user base to include staff and patients, incorporate specialty and generic reporting, allow Web-based access, and collect local and national data (Runciman).

The APSF developed the AIMS to serve as a repository database for collecting comprehensive information from many reporting systems. Although not fully embraced by the market, the AIMS now operates in more than 500 public and private hospitals in Australia and is used by 54% of the Australian Public Health System (Patient Safety

International, 2005). Additionally, the AIMS is being implemented in the United States, and Runciman suggests that it be considered as a cross-map system for utilization by the World Health Organization. This taxonomy may eventually provide an international template for the promotion of patient safety and error-reporting programs.

In the United States, the pharmacy profession took the lead in developing a classification system and database about medication errors. In 1998, the U. S. Pharmacopoeia released MEDMARX, an anonymous, Internet-based, medication error reporting and classification system for all health care practitioners within subscribing hospitals and health care systems (Cousins, 2000). The MEDMARX medication error reporting system is unique in that it analyzes only one category of error, that of medication errors. The MEDMARX system provides a standardized taxonomy that collects comprehensive information about medication errors, including individual, team, and system factors. MEDMARX is the largest repository of medication error information in the United States, having accumulated more than 500,000 records from nearly 500 participating institutions (Hicks, Cousins, & Williams, 2004). The data collected by MEDMARX are “uniform and comparable” (Hicks, Cousins, et al., p. 994) and support national, state, and local methods to study, understand, and prevent medication errors. Subscribing health care systems can use the database “to collect, analyze, compare, and disseminate their medication error data and propose practical solutions that may be applicable to other subscribing hospitals” (Hicks, Cousins, et al., p. 994). MEDMARX is a highly specialized type of taxonomy and, as such, would not be general enough to serve as the sole method for capturing nursing error data. However, the management of medication is a core component of nursing practice in many health care settings, and understanding the “who, what, when, and where” of adverse drug events should lead to improved practice.

MEDMARX analysis has already contributed to the development of information that is changing how nurses and other health care workers practice. For example, MEDMARX has identified that insulin products are most often cited in errors that resulted in harm to the patient (Hicks, Santell, Cousins, & Williams, 2004). This type of information can provide direction to nurses and other health care administrators in identifying high-frequency, high-impact errors and thus inform the facility on how to prioritize and allocate resources.

A more recently developed error classification system is the Patient Safety Event Taxonomy (PSET) developed by JCAHO. It serves as a comprehensive “mother” database for smaller, more specific reporting systems to feed into, thereby providing mega-collection and classification (Chang et al., 2005). Although not yet fully operating, the system has the ability to provide a “backbone” for the common domain of patient safety features (Chang et al., 2005). The purpose of a large, comprehensive classification system such as the PSET is to facilitate the integration of existing, specialized reporting systems for the purpose of sorting and analyzing aggregate data (Melinda Murphy, personal communication, September 9, 2005). The goals of the PSET are to better understand errors and system failures, facilitate and disseminate information globally, and reduce the level of risk and harm to patients (Chang et al., 2003). Several methodologies were utilized in the development of the taxonomy, including the integration of existing taxonomies, use of a nominal workgroup process, input from stakeholders to investigate validity, comparative reliability testing, and an extensive review of the literature (Chang et al., 2005).

Because the PSET has the capacity to serve as a global repository classification system, it could potentially be used to evaluate the quality of reported incidents, the effectiveness of reporting systems, and the success of intervention strategies (Chang et

al., 2005). The error classification section in the system provides an expansive view of the effect of the error. For instance, in conjunction with medical and psychological harm to the patient, legal and economic outcomes are also evaluated. The addition of legal and economic analysis could contribute to a broad-based policy perspective, providing a much more comprehensive approach to the resolution of iatrogenic injury.

The most recently developed taxonomy is the TERCAP. This classification system was developed by the NSCBN, which represents all state boards of nursing in every jurisdiction of the United States (Benner, Sheets, Uris, Malloch, Schwed, & Jamison, 2002). Understanding that state boards of nursing are a rich source of data concerning nursing error, the NCSBN began studying the feasibility of developing a taxonomy of nursing errors to describe and distinguish types and sources of nursing errors (Malloch, 2004). Nursing errors, also called practice breakdown, are an important source of information to promote patient safety and should be evaluated in the context of the individual, the practice of nursing, and the environment (Benner et al., 2002; Malloch, 2005). Consequently, the TERCAP was developed to collect and analyze data relating to discipline cases within state boards of nursing. In conjunction with classifying system and health care team threats to safety, the TERCAP also provides a detailed classification of the individual nurse's breakdown in practice standards. Specifically, the categories of practice breakdown evaluate nursing error as a component of a breakdown in a nursing practice standard. These categories were developed by the NCSBN to reflect components of nursing practice that are "meaningful to aspects of good nursing practice and to the nurse's moral agency, knowledge, skill" (Benner et al., 2006, p. 56).

The preceding discussion reviewed what is known about error taxonomy classification systems and provided the background for the more detailed theory and research review related to threats that contribute to the commission of errors and pose

barriers to patient safety. This discussion reveals that there is a substantial effort by the United States and Australia to promote nomenclature for error classification. Both the AIMS and the PSET are global and quite comprehensive; however, the PSET has yet to be implemented, and the AIMS model is not prominent in the United States. Data from MEDMARX has been compiled into a five-year report and is providing comprehensive information about medication errors (Hicks, Santell, et al., 2004). The TERCAP was implemented in February 2007, and approximately twelve state boards are participating (NCSBN, 2007). The following section highlights what the literature reflects about threats to patient safety.

THREATS TO PATIENT SAFETY

Understanding the dynamics of overt and latent threats in error commission has recently affected how members of the health care industry view errors, particularly as they relate to nursing care. Historically, errors made by health care practitioners have been reviewed and resolved by addressing the individual's competency and professional responsibility (Cohen, 2000; IOM, 2000, 2004). As the problem with medical error became more prominent and evidence suggested that the analysis of error should be approached more comprehensively through an evaluation of individual and system contributions, researchers looked to high-risk industries outside of the health care industry that had successfully addressed the issue (AHRQ, 2000; IOM, 2000, 2004). James Reason's landmark book, *Human Error* (1990), identified that inevitable human factors in individuals contribute to errors, as do macro-level organizational factors. He framed these concepts as active errors and latent errors. Latent errors (or what he later described as latent conditions) are those actions made by high-ranking decision makers in a system that affect patient safety in insidious ways (Reason, 1990, 2000). Latent conditions are typically described as the system components that increase the likelihood

of error. Active errors (often called the sharp end of an error) are those errors made by providers who work directly with patients and are recognized immediately. The TEMM provides a more specific framework for reviewing overt and latent threats. This framework, in conjunction with a review of the literature and the TERCAP, provides common themes that should be evaluated. These themes include individual practitioner, patient, health care team, and organizational/system threats to patient safety. A brief theoretical review, as appropriate, and a description of the research are provided.

CHARACTERISTICS OF INDIVIDUAL PRACTITIONERS THAT MAY POSE THREATS TO PATIENT SAFETY

Numerous studies address the individual health care practitioner's contribution to errors that may result in a threat to patient safety. Prominent are studies involving what is called "human factors." A discussion of human factors science is presented in this study, as well as a review of the research concerning health care worker fatigue, which is a common issue found in human factors research. Other prominent areas of research concerning individual threats to patient safety involve the competencies of the health care practitioner. Finally, research will be presented that investigates unprofessional conduct that may impede safe patient care.

Human Factors Science

Human factors is a branch of science that focuses on the cognitive performances of humans and is an important component to error resolution in high-risk industries (Ergoweb.com, 2006). This science was developed through research by cognitive psychologists who studied the phenomena of human processes involved in errors. The science of human factors purports that humans will make errors for a variety of known and complicated reasons (IOM, 2000). James Reason (1990) developed the generic error-modeling system (GEMS), which outlines three types of human performance: skill-based,

rule-based, and knowledge-based. Performance at each of these cognitive levels can be involved in the error commission process. For example, skill-based human performance allows individuals to carry out routine functions primarily in an automatic manner. Errors such as slips or lapses in memory are found within this domain of performance. Rule-based behaviors apply to the activation of a relevant set of rules to provide solutions to problems, such as “if” (state)/“then” (action) rules. Mistakes may occur in the misapplication of rules to conditions that demand a different set of actions and may involve a deficiency in judgment in the selection of actions needed to address a problem (Reason, 1990, 1997). Individuals with expertise have a much larger repertoire of problem-solving rules than novices (Reason, 1990). Knowledge-based behaviors that lead to errors are due to incomplete or incorrect knowledge. These types of mistakes are composed of several factors, including attention given to the wrong features or not given to the right features, ignoring things that are not present (out of sight, out of mind), overconfidence, oversimplification of causality, and complexity of problem solving (Reason, 1990).

The hallmark study in health care that investigated human factors in the analysis of error by reviewing anesthesia “mishaps” was a 1978 study by Cooper, Newbower, Long, and McPeck (1978). This exploratory study resulted in one of the first publications that reviewed the medical community’s reflection on individual practice and how less-than-perfect behaviors relate to error and injury (Pierce, 2001). Using an inductive approach with specified definitions, Cooper et al. conducted interviews with 47 anesthesiologists who described 359 preventable events. The findings of this study suggested that the majority of errors were related to individual error (82%), a finding that has been supported by a report of the MEDMARX system but refuted by many other researchers, who claim that system components are the primary reasons for error

(MEDMARX; Hicks, Santell, et al., 2004; IOM, 2000, 2004; Reason, 1990). The results of this early research may reflect a bias toward the individual contributions to error because of the lack of knowledge at the time about systems' contribution to errors. However, this early work became the template for further study in health care regarding human error and, subsequently, anesthesia became the discipline that prompted the studies by others in health care (Cooper et al., 1978).

Fatigue

A human factor that is becoming more apparent in the health care literature is that of the effect of fatigue on the health care worker and its relationship to medical error. Jha, Duncan, and Bates (2001) conducted a review of the literature to determine evidence of fatigue in medical personnel and whether there were strategies that effectively mediated its effects. The researchers found that the literature substantiated the theory that fatigue did occur among medical personnel; however, there was no evidence that sleep deprivation led to poor job performance. The researchers did find evidence in other, non-health care industries that identified variables such as shift work, sleep hygiene, workplace lighting, napping, and medical therapies such as Melatonin as factors that affected work performance. The researchers concluded that there was nothing in the health care industry that supported findings cited in other industries; however, they also noted that there were few studies on fatigue and its impact on patient outcomes and that of the studies conducted, most were poorly designed. Jha and colleagues concluded that further research in the area was needed (Jha et al., 2001).

A more recent descriptive study about hospital medical residents' fatigue and adverse outcomes from error bridges the literature gap identified by earlier research (Jagsi, Kitch, Weinstein, Campbell, Hutter, & Weissman, 2005). Fatigue in hospital residents is an issue because they are relied upon to provide medical care after hours and

on the weekends. Often these residents work an exceedingly high number of hours, which only recently has been limited to 80 hours per week (Accrediting Council for Graduate Medical Education, 2005). To ascertain factors about residents and their views on patient safety events, a survey was conducted (no report of reliability and validity) to solicit their experiences with adverse events, mistakes, and near misses. According to the 689 responses, the median number of hours slept while on overnight call was three hours. Eighteen percent (114) responded that a patient under their care had had an adverse event because of an error. Of these, 37% (42) felt they were partially responsible. Twenty-three percent (141) also reported near-miss incidents in which they were involved. Adverse events were most frequently (24%) attributed to a mistake. The most commonly perceived reasons for adverse events were excessive work hours (19%), inadequate supervision (20%), and problems with handoffs such as during change of shift (15%). A multivariate analysis was conducted that outlined significant predictors of adverse events. These predictors included working in an in-patient rotation ($p < 0.001$), more than 80 duty hours in the last week ($p = 0.04$), and procedural specialty ($p = 0.009$). The researchers concluded that the study provides evidence that adverse events are commonly encountered by physicians and that residents should be queried to determine the occurrence of adverse events not identified in other processes (Jagsi et al., 2005).

Research with both nurses and physicians explored attitudes toward error, fatigue and stress in their workplaces (Sexton, Thomas, & Helmreich, 2000). Using a non-experimental design, the researchers surveyed 1,033 health care personnel involving physicians, operating room (OR) nurses, and intensive care unit (ICU) nurses to ascertain attitudes concerning individual vulnerability to error and stress. For the study, the researchers modified surveys (with no report of instrument reliability and validity) from questionnaires developed for the aviation industry to measure attitudes toward stress,

fatigue, status hierarchies, leadership, and personal interaction issues. Results indicated that the majority of respondents did not acknowledge their limitations due to stress and fatigue. For instance, in response to the statement, “Even when fatigued I perform effectively during critical phases of patient care,” 64% of ICU nurses and 60% of OR nurses agreed with the statement. Physicians reported similar response rates. Responses to the statement, “A truly professional team member can leave personal problems behind when working in the OR/ICU” were similar (70% of ICU nurses and 70% of OR nurses agreed). The researchers surmised that these health care personnel did not acknowledge limitations related to stress and fatigue due to acculturation in educational programs and residencies. Sexton and colleagues argue that if health care providers acknowledged their limitations and increased the use of threat and error management strategies, the likelihood of error would decrease (Sexton et al., 2000).

Competency

An issue gaining national attention is that of continued competency in health care professionals (CAC, 2003). *Competence* is defined as “the condition of being well qualified, capable, and fit” (Merriam-Webster’s Collegiate Dictionary, 2002). For the health care professional, competency is gained through pre-service education, in-service training, and work experience (Kak, Burkeholter, & Cooper, 2001). Health professionals take licensing exams after completing their respective educational programs. Passing these exams demonstrates the individual’s basic competency and ability to enter the workplace and meet minimum standards of care. However, there is only a one-time requirement to take licensing exams. Once individuals pass the exam, they are generally licensed for life. Does a one-time validation of competency ensure that the practitioner can provide safe, quality patient care? The literature reflects that it is not sufficient and that ongoing, rigorous methods to enhance competency should be implemented (CAC,

2003). Efforts to evaluate and ensure continued competencies in health care professionals are inconsistent, vary from state to state, and lack evidence of effectiveness (CAC, 2003). In an effort to develop policies to address this issue, the IOM (2003) reported that ongoing, valid, and reliable competency assessment and assurance will promote safer and higher quality care for the public. The CAC has endorsed the IOM recommendations and is promulgating a national agenda to promote the competency of health care providers to improve patient safety and quality patient care (CAC, 2003). The CAC believes that the current patient safety focus weighs too heavily on system issues and too little on individual competency as a component of error commission (CAC, 2004). In July 2003, the CAC hosted a national summit at which the participants developed a conceptual framework for continued competency that included periodic assessment, development and implementation of a personal plan, documentation of the plan, and establishment of a method to demonstrate and evaluate competency. Several barriers were identified in implementing a national agenda, including legal, cultural, political, economic, and administrative barriers (CAC, 2003).

To address these barriers, the CAC (2004) developed a “road map” to provide direction for the development of a national agenda for continued competency in health care professionals. Its plan is comprehensive and includes studies of competency model effectiveness, policy development at the national level, development of evidence-based standards, and reevaluation of continuing education methodologies. Its initiatives are currently gaining credence in the nursing regulatory arena. For instance, the NCSBN is conducting a practice analysis study to determine current competency requirements in the workplace (R. Kearney-Nunnery, personal communication, October 19, 2005). The North Carolina Board of Nursing is taking a leadership role in the development of new methodologies for ongoing assurance of competency. It has changed its requirement for

continuing education and now requires nurses in North Carolina to develop their own professional development competency plans. Once the plans are developed, the nurses select from several board-approved strategies to find the one that is best suited for helping them accomplish their plans for continued competency (North Carolina Board of Nursing, n.d.).

In an exploratory study, five years of descriptive data within the MEDMARX system were analyzed for types of, causes of, and contributions involved in medication error commission (Hicks, Santell, et al., 2004). The most frequently cited error in the report was related to competency and was described as “performance deficit” (38%). However, the researchers indicate that this factor was often cited in combination with other causes of error such as “procedure not followed” (17.6%), “transcription inaccurate” (13.4%), and “documentation” (11.5%). The researchers claim that these findings indicate the multicausal nature of medication errors and that people who complete the report choose the performance deficit factor when no other explanation is apparent (Hicks, Santell, et al.). They suggest that a root cause analysis may be needed to ascertain other organizational, technical, and human factors.

Professional certification may be a means to promote continued competency. Health care professionals with professional certification would be required to meet practice and educational requirements established through a professional credentialing body. However, research demonstrating competency through specialty certification has resulted in mixed findings. Using correlational analysis with data from the MEDMARX reporting system, Bulla (2003) examined the relationships among certification status (specialty certified vs. non-certified) and severity of medication errors using a patient harm index in the MEDMARX that ranks the severity of the medication errors from no harm to patient death. The author reported that the mean and standard deviations of

severity (certified nurse $M = 3.67$, $SD = 1.225$; non-certified nurse $M = 3.43$, $SD = 1.118$) were equally spread among the groups while a t-test ($t = 0.579$) found there was no difference between the two groups in the severity of errors. The researcher concluded that certification status, as a form of competency, has little bearing on patient outcomes from medication errors (Bulla, 2003).

Phronesis and Techne

The importance of nursing as a synthesis of “phronesis” and “techne” has been explored by Benner et al. (2006). Phronesis involves ethical and clinical judgment carried out in a skilled practice. Techne shapes things in a standardized manner that can be called technique. In health care, phronesis is carried out through relationships with patients, while techne results in outcomes that “can be reduced to routine, predictable, and standardized care” (Benner et al., 2006). The importance of the discussion on phronesis and techne is that the recent literature on patient safety emphasizes an analysis of systems’ contributions in error commission and de-emphasizes individual contributions. System factors must be considered in the analysis of error; however, the individual professional mandates of phronesis and techne cannot be ignored. For example, Vincent (2003) identifies several factors related to the breakdown of managing care of the patient. Vincent calls these “care management problems,” and they involve the failure of the health care provider to meet professional standards. Vincent identifies care management problems as a failure to monitor the patient, a delay in diagnosis, incorrect assessment of risk, deviation from an agreed protocol without clinical justification, and wrong treatment given. Vincent indicates that these care management problems have two essential features: factors outside the boundary of safe practice and adverse patient outcomes (2003). The identification of these factors is an acknowledgment that individual contributions to error do matter and should be considered in error-resolution strategies. It

is interesting to note the similarities found in Vincent's classification and the TERCAP, developed by Benner in conjunction with the NCSBN (Benner et al., 2002). Although the TERCAP is specific to nursing, both classification systems highlight the individual professional's contribution to error, such as a lack of patient assessment, monitoring, and assurance of compliance with orders or protocols.

Unprofessional Behavior

In addition to meeting professional standards, health care professionals have a duty to avoid engaging in unprofessional behavior. Unprofessional behavior in health care providers is an area of concern for licensing boards whose mission is to protect the public. Unprofessional conduct may involve substance abuse, sexual misconduct, negligence, or any behavior that reflects incompetent, unethical, or illegal activity in licensed health care professionals, all of which may injure or harm patients (BNE, 2006). Because boards of nursing are a rich source of data on nursing errors, the NCSBN compiles descriptive information about nurses who have been disciplined by state boards of nursing. This descriptive data provides information to stakeholders such as legislative bodies about areas of nursing practice breakdown and responses from boards of nursing. For instance, the length of time it takes a board of nursing to complete an investigation is of concern because of the need for timely remediation to ensure safe practice. In a survey of 19 boards of nursing, the NCSBN found that a total of 17,041 investigations were conducted in fiscal year 2002, with 11,991 (70%) completed in the same year. The majority of these cases (26%) were related to unprofessional conduct, with substance abuse (23%) being the second-leading cause for discipline (NCSBN, 2004).

The NCSBN is challenged by a myriad of different legal, administrative, and methodological issues in its efforts to collect data from all of the state boards of nursing. To facilitate a standardized methodology to categorize errors and evaluate outcomes, the

NCSBN has been developing the TERCAP as an instrument to compile data from state boards of nursing concerning nursing error and its relationship to patient harm.

There is research about the relationship between unprofessional conduct in medical school and subsequent disciplinary action by a licensing board. Papadakis and colleagues (Papadakis, Hodgson, Teherani, & Kohatsu, 2004; Papadakis, Teherani, Banach, Knettler, Rattner, & Stern, 2005) conducted studies of medical students to ascertain factors that contribute to subsequent disciplinary action. In the first exploratory study (Papadakis et al., 2004), the researchers reviewed all the graduates from a West Coast university who had been disciplined by the state board during the period from 1990 to 2000. Graduates who had been disciplined ($N = 68$) were identified and matched by graduation year and specialty with controlled graduates ($N = 196$) who did not have board discipline. Results indicated that there was a small but significant difference in undergraduate grade point average (3.3 GPA disciplined, 3.4 GPA non-disciplined, $p = 0.04$). The study also found that students in medical school who received written comments regarding unprofessional behavior were twice as likely to be disciplined by a board of medicine for a violation related to unprofessional conduct (odds ratio, 2.15, $p = 0.02$). Papadakis et al. (2005) replicated this study by examining graduates ($N = 235$) from three medical schools who were disciplined by any of 40 state boards of medicine. As in the previous study, there were undisciplined physicians ($N = 469$) who were matched according to medical school and graduation year. Again, there was a small but significant difference in grade point average between the disciplined and undisciplined groups (GPA 3.3 disciplined, GPA 3.5 undisciplined, $p = 0.002$). In addition, there was a significant difference in the Medical College Admission Test (MCAT) scores (0.6 disciplined, 0.8 disciplined, $p < 0.001$). Prior unprofessional conduct in medical school was strongly associated with later disciplinary action by a board (odds ratio, 3.0, $p <$

0.001). Two types of unprofessional behavior independently predicted disciplinary action: irresponsibility (odds ratio, 8.5, 95% confidence interval, 1.8 to 40.1) and diminished capacity for self-improvement (odds ratio, 3.1, 95% confidence interval, 1.2 to 8.2). The 2005 Papadakis et al. study supports the findings of the author's earlier research and may be useful for evaluating unprofessional conduct in the general population of medical students. The researchers state that the study provides support for specific actions to be taken by medical schools, including the inclusion of professionalism as a competency, graduation objectives that contain explicit language about professional behavior, and standardized instruments that assess personal qualities of medical school applicants and can predict early medical school performance (Papadakis et al., 2005).

In summary, studies pertaining to the characteristics of health care practitioners support their involvement in medical errors. Human Factors Theory provides an approach to understanding human error (IOM, 2000; Reason, 1990). The effects of fatigue in medical error are becoming more prominent in the literature, and studies reflect that health care workers do report errors while fatigued and often are not aware of their own limitations from stress and fatigue when providing care to patients (Jagsi et al., 2005; Sexton, Thomas, & Helmreich, 2000). Addressing health care worker competency to improve patient safety has been prioritized by the CAC; however, studies to support competency as a contributing factor in error commission are not conclusive (Hicks, Santell, et al., 2004; Bulla, 2003). Unprofessional behavior in health care practitioners is of concern to boards of nursing in regards to patient safety. Two studies indicate that students who are disciplined for unprofessional behaviors in medical school as more likely to be disciplined by a board of medicine once licensed (Papadakis et al., 2004; Papadakis et al., 2005).

CHARACTERISTICS OF HEALTH CARE TEAMS THAT MAY POSE THREATS TO PATIENT SAFETY

The majority of research found in the patient safety literature concerns communication within teams as a threat to patient safety and a factor in medical error. This section will review the research related to communication within teams in the aviation industry and the health care industry. This approach is pertinent given earlier discussions on the aviation industry's contribution to research on safety.

Sexton, Thomas, and Helmreich (2000), in a study of 1,033 doctors, nurses, and residents, found that communication and teamwork not only served to manage errors; they also increased efficiency, morale, and satisfaction with employment. Vital Smarts (2005) reports that poor teamwork in the health care industry is a widespread problem and a factor that impedes patient safety. JCAHO statistics from 1995 to 2004 on root causes of sentinel events such as patient death and serious patient harm reflect that factors in communication are involved in almost 70% of sentinel events (JCAHO, 2005). Helmreich (2000a) has conducted observational studies of team communication in both the aviation and the health care industries. Error conditions observed in airplane cockpits included procedural and communication deficiencies that highlighted the need for team training (Helmreich, 2000a). Similar behaviors were also observed in teams in the OR setting, including communication issues such as failure to inform a team member of the patient's problem, leadership issues such as failure to determine who was the leader in the OR, and interpersonal conflict such as overt hostility to team members (Helmreich, 2000a).

There have been a number of studies conducted in the OR concerning health care team interaction and communication. This may be due to anesthesia's early role in human factors science (Pierce, 2001) and the fact that surgical settings and procedures are

conducive to observing the entire health care team in one place at one time. In an observational study of teamwork communication (Lingard, Espin, Whyte, Regehr, Baker, & Resnick, 2004), trained observers reviewed 48 surgical procedures involving 94 team members, including physicians and nurses using a framework of content, audience, purpose, and occasion of a communication exchange. Communication failure was defined as an event in one or more of the factors in the framework. Results of the study indicated that 30% of the communication events were failures. Of the failures, 36% resulted in inefficiency, tension, waste of resources, delay, inconvenience for the patient, or procedural error (Lingard et al., 2004). As a response to this study, the researcher conducted another study to ascertain the feasibility (willingness to use and ability to incorporate into work processes) of a checklist for the OR team to ensure a review of critical factors related to the surgical procedure (Lingard, Espin, Whyte, Colmenares, Baker, & Doran, 2005). Trained observers used ethnographic field notes and brief feedback interviews. Eighteen teams and their corresponding surgical procedures were reviewed. The rate of the OR team members using the checklist was 100%. Review of the checklist by the OR team took 1 to 6 minutes (mean 3.5 minutes), and most of the reviews took place before the patient's arrival. The OR team members' perceived function of the checklist included documentation of detailed case-related information, confirmation of details of the case, verbalization of concerns or ambiguities, and team building. The most frequent barrier identified in the study was bringing the team members together to review the checklist due to the variability of each member's preoperative responsibilities for the case. The researchers concluded that the checklist showed promise in promoting an exchange of information and team building, though further testing was needed to determine the impact on patient safety (Lingard et al., 2005).

An intervention study of medical team training as the treatment was conducted to determine the effect of the training on communication among the members of the health care team in the OR (Awad, Fagan, Bellows, Albo, Green-Rashad, & De la Garza, 2005). The training consisted of didactic instruction, interactive participation, role-play, and clinical vignettes. A change team contributed to the study by reinforcing principles of the training through a preoperative briefing with the team. The researchers conducted a pretest and a posttest analysis (instrument reported as “validated”) to ascertain the perspectives of OR staff (physicians, anesthesiologists, and nurses; N not reported) on the improvement of communication within the team after the training. Pre- and posttests of the team produced mixed results. Surgeons ($p < 0.0004$) and anesthesiologists ($p < 0.0008$) showed significant increases in their perception of team communication after team training. The nurses, however, did not indicate any improvement in communication after the training ($p = 0.7$). The researchers surmised that this was due to the small number of nurses (N not reported) in the study, and they suggested that future studies that included training for all of the surgical nurses would improve nursing scores (Awad et al., 2005). However, it is interesting to note that in a study conducted by Sexton et al. (2000) of OR and ICU staff, 77% of doctors rated teamwork within their group at a high level while only 40% of nurses who worked with them did so. Although anecdotal, these differences might suggest varying ideas about what constitutes effective teamwork based on discipline or perhaps even gender.

Thomas, Sexton, and Helmreich (2004) conducted focus groups of physicians and nurses ($N = 36$) to ascertain their perceptions about working together in an ICU. Using qualitative data analysis, the researchers identified three main themes that affected each participant's ability to work with other members of the team. The first theme was provider characteristics such as personal attributes, reputation, and expertise. The second

theme related to workplace factors such as staffing, organization of work, and the working environment. The third theme related to group influences such as how the group communicated and relationships among the providers. The researchers concluded that the results of the study could promote the development of what they call behavioral markers to counter the effect of threats and errors in the environment. *Behavioral marker* is a term that describes evidence-based behaviors that have been shown to manage threats and errors in aviation and the health care arena (Thomas et al., 2004).

Communication of critical lab values is necessary to prevent potentially life-threatening situations for patients. Calling the treatment team over the telephone about critical results is the most common method used to communicate this information (Barenfanger, Sautter, Lang, As, Collins, & Hacek, 2004). Because of the opportunity to misunderstand critical patient lab values, a descriptive study was conducted to better understand the process. Three health care organizations, borrowing a methodology from the aviation industry that requires pilots to repeat directions from air traffic controllers, investigated whether this process would work for their organizations by using a process of repeating back the message of critical lab values when received. Participants included physicians, nurses, and other health care personnel who received calls from the laboratory. Of 822 calls from the laboratory, 29 (3.5%) involved errors. Calls made to physicians had the highest rate of error (physicians = 5.0%, nurses = 3.4%, other personnel = 3.5%). The average time to repeat the information was 12.8 seconds, and costs were determined to be approximately \$0.11 to \$0.16 per call. As a result of this research, JCAHO now requires the use of this method to improve communication and reduce errors (JCAHO, 2006; Barenfanger et al., 2004).

Lack of teamwork can also pose a threat to correctly identifying patients. In a root cause analysis and case study of a patient who was mistakenly taken for another patient's

electrophysiology procedure, it was found that both physicians and nurses failed to communicate with one another and did not listen to the patient. In addition, the analysis showed that team members were unsure of their roles and did not know the proper protocol for patient identification and transport. The researchers concluded that because of poor communication patterns, staff expected faulty and incomplete exchanges of information (Chassin & Becker, 2002).

Communication during “handoffs” is an area that needs research and study. Handoffs are defined as “the transfer of the role and responsibility for patient care from one person to another in a physical or mental process” (Solet, Norvell, Ruten, & Frankel, 2005, p. 1094). This study by Solet and colleagues included a review of the literature and an evaluation of four hospitals. Solet and colleagues identified several barriers to effective, safe patient handoffs. Of particular importance were language barriers between providers and non-English speaking patients. The researchers stated that strategies to improve handoffs include precise, unambiguous, face-to-face communication with standardized processes and educational methods to ensure an understanding of safe, satisfying, and effective methods (Solet et al., 2005).

Issues with the collective behavior of health care teams and its impact on patient safety were studied by Vital Smarts in partnership with the American Association of Critical Care Nurses (Vital Smarts, 2005). In a survey (no report of reliability and validity) of more than 1,700 health care personnel—including 1,143 nurses, 106 physicians, 266 clinical staff, and 175 administrators—participants were questioned about factors that contributed to a lack of quality care as well as employee satisfaction. Several factors emerged from the study that reflect barriers or threats to patient safety. These threats include the following:

1. Broken Rules – 84% of physicians and 62% of nurses and other clinical care providers have observed some of their team members (about 10%) take shortcuts that could be dangerous to patients.
2. Mistakes – 88% of physicians and 48% of nurses and other clinical care providers have observed some of their team members (about 10%) show poor clinical judgment.
3. Lack of Support – 53% of nurses and other clinical care providers report that 10% or more of their colleagues are reluctant to assist them, are impatient, or refuse to answer their questions.
4. Poor Teamwork – 88% of nurses and other clinical care providers have one or more teammates who undermine the team by exhibiting behaviors such as not doing their fair share or making themselves look good at the expense of others.
5. Disrespect – 77% of nurses or other clinical care providers work with some colleagues who are condescending or rude, and 33% work with some who are verbally abusive.

The respondents were also asked if they had approached their colleagues about the observed behaviors. Less than 1 in 10 had discussed their concerns with the coworkers. Lack of ability, a belief that it is “not their job,” and a lack of confidence that it would do any good were the most frequent reasons the respondents did not discuss their concerns with colleagues. Other obstacles included lack of time and fear of retaliation. The findings of the 10% who responded that they did speak up about factors that compromised patient care had statistically significant ($p < 0.001$) correlations with self reports of better patient outcomes, working beyond the minimum required, higher morale, and more satisfaction with their work (Vital Smarts, 2005).

In summary, the importance of communication within the health care team is reflected in several studies regarding medical error. Communication failure (Lingard et al., 2004), how groups communicate (Thomas et al., 2004), uncertainty of roles (Chassin & Becker, 2002), and a feeling by providers that it is “not their job” to approach colleagues who made errors (Vital Smarts, 2005) are among the threats to patient safety found within health care teams.

CHARACTERISTICS OF PATIENTS THAT MAY POSE THREATS TO PATIENT SAFETY

Patient characteristics that contribute to error commission and threats to safety also merit review and analysis. The literature is beginning to show that patient characteristics do contribute to errors. These characteristics include the patient’s accountability (or lack thereof) for their own health care, having the ability to identify threats and errors, physical characteristics, types of treatment, and communication barriers.

Accountability

A survey (no report of instrument reliability and validity) of 2,388 physicians, pharmacists, and nurses was conducted to ascertain their perceptions of barriers to patient safety and strategies to improve it (Iowa Department of Public Health, 2000). Both physicians (63%) and pharmacists (61%) reported that a lack of accountability by patients for the management of their health was a barrier to safe practice. Nurses did not identify patient-specific characteristics in their top four barriers, though they did identify staffing and funding issues. Although there was no consensus on which of the barriers had the most impact, the majority of the survey participants concurred that educating patients about their role in the health care system and establishing continuity of care across

settings are important activities to improve patient safety (Iowa Department of Public Health, 2000).

Identifying Errors

Can patients identify errors or injuries during their care? A study of hospitalized patients suggests that they can (Weingart, Pagovich, Sands, Li, Aronson, & Davis, 2005). The researchers conducted a prospective cohort study of 228 adults in a medicine unit in a teaching hospital. Investigators reviewed incident reports and medical records in conjunction with interviews of patients during their hospitalization and by telephone 10 days after discharge. The purpose of the interview was to ascertain the patients' perspectives of "problems, mistakes, and injuries" that occurred during hospitalization. Patients reported adverse events from errors in nearly 9 of 100 admissions. Serious injuries were not common, though two thirds of the patients reported that errors were preventable. The researchers reviewed the patients' medical records and hospital incident reports and found that only 40% of adverse events, medical errors, and near misses were documented. In addition to surveying patients, the researchers calculated event rates and utilized multivariable regression models to investigate factors associated with patient-reported events. Patients who were on more medications were more likely to report adverse events (incidence rate ratio [IRR] 1:1 for each additional medication). In addition, patients with three or more drug allergies were more likely to report errors (IRR 4:7). This study by Weingart et al. (2005) suggests that patients are able to identify errors and injuries during their care that may not be identified by normal reporting mechanisms. Additionally, those patients on multiple medications or with multiple drug allergies may be more likely to experience an adverse event.

Patient Characteristics

Patient-related errors were investigated in a descriptive study of patients who had foreign bodies left behind from surgical operations (Gawande, Studdert, Orav, Brennan, & Zinner, 2003). The researchers conducted a secondary analysis of data from medical records or claims from a large malpractice insurer's database related to this type of error. They identified 54 cases with records of a retained foreign object. For a control group (N not reported), they randomly selected cases that had the same type of surgery without incident. The researchers found that patients with retained foreign bodies were significantly more likely ($p > 0.001$) than the controls to have had emergency surgery or an unexpected change in the surgical procedure ($p > 0.001$). Patients with a higher mean body-mass index were also less likely to have had counts of sponges and instruments. A multivariate analysis showed that factors associated with an increased risk for surgically retained foreign bodies included emergency surgery ($p < 0.001$), unplanned changes in the operation ($p = 0.01$), and higher body-mass index ($p = 0.01$). The researchers also found a 1:1 risk ratio for each one-unit increment in the body-mass index.

Communication

As noted earlier in the literature review, communication between health care providers is an important factor in error commission. Additionally, communication between the patients and health care providers is equally important. The issue of language barriers and their association with errors was investigated in families with hospitalized pediatric patients (Cohen, Rivara, Marcuse, McPhillips, & Davis, 2005). In a nonexperimental, case-controlled study, 97 pediatric patients who had a reported serious medical error in a large academic regional hospital over a five-year period were compared with 475 control patients who did not have a serious medical error. The case patients were matched on the factors of age, admitting service, admission to intensive

care, and date of admission with the control patients. The researchers found that the largest subgroup of the case group included Spanish-speaking patients and families who had a two-fold increased risk of having a serious medical error (odds ratio, 2.26, 95% confidence interval). The results suggest that patient safety initiatives in hospital settings may need strategies that address language barriers.

An investigation of the importance of communication between health care providers and patients with abnormal mammograms was conducted by Poon, Hass, Puopolo, Gandhi, Burdick, and Bates (2004). The researchers implemented a prospective longitudinal study utilizing medical records and patient surveys in 10 ambulatory care centers. To determine the proportion of women who received appropriate follow-up care, 126 cases of women who had abnormal mammograms were analyzed. Of the 126 women in the study, 81 (64%) received appropriate follow-up care. After risk adjustment for age and insurance status, two communication factors were found to be independently associated with appropriate follow up. The most significant factor was the patients' understanding of the need for the follow up ($p = 0.006$). Secondly, the researchers found that the physicians' documentation of a follow-up plan in the medical record was also significant ($p = 0.029$). None of the patients' physical or psychological factors were associated with appropriate follow-up care (Poon et al., 2004).

In summary, studies regarding patients' contribution to error reflect that patients are able to identify injuries and errors during their care and should be educated and held accountable for their role regarding patient safety (Weingart et al., 2005; Iowa Department of Public Health, 2000). Certain treatments and patient conditions, including language barriers, may precipitate medical errors, and health care settings should develop strategies to monitor and address these factors (Weingart et al., 2005; Gawande et al., 2003; Poon et al., 2004).

CHARACTERISTICS OF HEALTH CARE SYSTEMS THAT MAY POSE THREATS TO PATIENT SAFETY

What constitutes organizational/system threats in medical error? Though the TEMM outlines “Organizational Culture” as a latent threat and “Organizational Factors” as an overt threat, the literature reflects the grouping of both of these concepts into one broad concept called “Systems Issues or System Factors.” Because the research supports this approach, the following review of the literature will address latent and overt threats under the rubric of health care systems threats. Topics in this review include staffing and its relationship to patient outcomes, cultural aspects that influence the reporting of errors, and the effect of information technology on threats to patient safety. To facilitate an understanding of the magnitude of patient safety and systems research, a brief theoretical discussion will provide the context for the research that has been conducted in this area. In addition, research about the patients’ perspectives on system threats to quality health care supports a holistic review of the issue.

Health care organizations are complex systems and as such have many interdependent parts. The number of parts, combined with the interdependency of the parts, determines an organization’s complexity (Scott, 2004). Asymmetry in the information exchange within a system contributes to an organization’s complexity and requires an understanding of non-linear methodologies in managing health care organizations (McDaniel & Driebe, 2001; Thomas, & Houston, 2005). Gaps form in complex systems between people and processes, which leads to an inconsistency between the beginning and the end of care processes (Hemman, 2002).

What are some of the components of failure in complex systems that contribute to error? In a study involving a review of the literature and telephone interviews of leaders in the patient safety research and policy arena, Walshe and Shortell (2004) found several

common themes that appear to contribute to instances of major failures. These include repeated, well-known (but not addressed), long-standing problems; lack of management or review of incident reporting and performance; and barriers to disclosure and investigation. In addition to a complex health care organization, the analysis of nursing care's effect on patient outcomes is also complex. Bowker and Starr (2000) discuss the invisible nature of nurses' work, claiming that nurses' tasks are so numerous and pervasive that defining the continuum of duties needed to care for patients is complex and difficult. Yet it is these phenomena that may very well contribute to, or impede, patient safety. Investigating the latent (or hidden) contributions to errors as well as the more visible overt contributions acknowledges the multidimensional contributions of a complex environment found within most health care organizations and supports a more sustained error management plan.

Staffing

Vincent (2003) claims that there are factors in the work environment, such as staffing ratios, that can produce error-causing conditions. Blegan, Goode, and Reed (1998), using data from hospital records, investigated the relationships among incidence rates of six commonly reported adverse patient outcomes and the proportion of hours of care given by RNs. The researchers controlled for the acuity of the patients on the unit through a risk-adjustment methodology. Using a multivariate analysis, the researchers found that the proportion of hours of care delivered by RNs was inversely related to medication errors (-0.530), decubiti (-0.485), and patient complaints (-0.312). An unexpected finding was that proportion of care that was delivered by RNs was curvilinear. As the RN proportion of nurse staffing increased to 87.5%, the rate of adverse outcomes decreased. However, if the RN staffing went above 87.5%, the level of adverse patient outcome rates increased. The researchers surmised that this unexpected

finding was related to patient acuity and, although they controlled for patient acuity, these controls may not have been sensitive enough for the study (Blegan et al., 1998).

In an exploratory study, patient outcomes and nurse staffing were examined by utilizing secondary data from 168 hospitals in Pennsylvania, the American Hospital Association, and the Pennsylvania Department of Health Hospital Survey (Aiken et al., 2002). The researchers' objective was to investigate whether risk-adjusted surgical mortality rates and deaths from serious complications were lower in hospitals where the RN-to-patient ratios were lower. The researchers utilized a risk-adjustment process to control for patient and hospital characteristics. Using logistic regression models, they found that the odds of patient mortality increased by 7% for every additional patient in a nurse's assignment. The researchers suggested that if RNs were assigned four patients instead of eight, an estimated 1,000 patients might receive a nursing intervention that would save their lives (Aiken et al., 2002).

Potter, Barr, McSweeney, and Sledge (2003) also investigated nurse staffing and patient outcomes. Using a prospective, correlational design, the researchers measured several nurse-sensitive outcomes in patients, including patients' perceived health status, pain, and self-care ability, to ascertain whether these outcomes were affected by staffing variables. The study was unique in that it included self-reported patient data regarding symptom management and self-care status for the purpose of developing a baseline to track patient outcomes. The percentage of RN hours was negatively correlated with the patients' perceived pain ($-0.31, p < 0.05$) and self-care ability ($-0.33, p < 0.05$) and positively correlated with the patients' perceived health status ($0.31, p < 0.05$). These findings suggest that the higher the percentage of nursing care by RNs, the lower the perception of pain and self-care needs and the higher the patients' evaluation of their

health status. The researchers concluded that the study supported the predictive value of nurse staffing (Potter et al., 2003).

Culture of Safety

The importance of effective reporting systems to create and sustain cultures that promote patient safety has been emphasized by the IOM (2000, 2004). Research in this area substantiates this emphasis. In a qualitative study using a structured interview process, 22 health care professionals (12 patient safety officers and 10 nurses) and 15 patients from a sample of acute care hospitals (N not reported) in Pennsylvania were queried about their perceptions of breakdowns in error-reporting systems (Atkins, 2004). Nine themes emerged related to the reduction and recurrence of medical error. These themes included low reporting due to a blaming culture, lack of standardization of error-reporting systems, failure to complete error-reporting forms, corrective actions that are not effective, a disconnect between frontline workers and administration, and not incorporating all hospital personnel into the error-reporting system. Based on the findings and conclusions of the study, the researcher offered recommendations for each major breakdown in the error-reporting system (Atkins, 2004).

In a descriptive study of reporting systems in non-medical systems, researchers found several barriers and incentives in the organizational culture that impeded the error-reporting process (Barach & Small, 2000). Using a literature search and semi-structured interviews with directors of reporting systems and experts in the field (N not reported), the researchers identified individual, organizational, and societal barriers and incentives to reporting errors. For instance, individuals may fear reprisal and have a lack of trust about reporting, which can be mitigated by reporting systems that provide confidentiality and immunity. At the organizational level, fear of litigation, costs, and bad publicity decreased reporting but were mitigated by reporting systems that provide immunity and

trustworthiness. Likewise, legal barriers in societies include impediments to peer review and a lack of communication between multi-institutional databases. Mitigating activities to these barriers include the assurance of accountability and enforcement of reporting statutes. Societal actions that can mitigate barriers to reporting include the assurance of accountability and enforcement of reporting statutes. The researchers concluded that reporting systems are effective in non-medical, high-risk industries because they benefit the organization more than they cost. The researchers propose that similar benefits may have promise in the health care industry if established into an organization's culture.

In an intervention study, the effects of "executive walk rounds" (EWR) on nurses' attitudes toward the safety climate were evaluated using a pretest and posttest evaluation (Thomas, Sexton, Neilands, Frankel, & Helmreich, 2005). To test the model in health care, the researchers formed an EWR group that was composed of two executive vice presidents and four assistant vice presidents, hypothesizing that EWRs would improve the safety climate on the clinical units. The researchers randomly assigned 23 units to the study. Eleven units were assigned to the intervention group, and 12 units were assigned to the control group. A sample of 260 nurses (RNs, Licensed Vocational Nurses [LVNs], and nurse managers) and other health care personnel (N not reported) who worked on the intervention units were visited by the EWR team. There were 338 nurses (RNs, LVNs, and nurse managers) and other health care personnel (N not reported) who worked on the control units and did not receive an EWR visit. The baseline Safety Climate Survey (reliability and validity not reported) was administered to all of the participants between September 1 and October 15, 2002. The EWR occurred between October 31, 2002, and January 31, 2003. The Safety Climate Survey was re-administered in March and April 2003. The researchers reported only the results relating to nursing personnel. Results indicate that the baseline mean safety scores before the EWR intervention were similar

between the two groups (78.97 control, 76.78 intervention, $p = 0.458$). There was no significant difference between the control group and the intervention group (77.93 control, 78.33 intervention, $p = 0.854$) after the EWR. However, there was a significant difference in the scores on the Safety Climate Survey between nurses in the intervention group who had actually been on the unit during the EWR and nurses who were on the control unit and did not experience the EWR (74.88 control, 81.01 intervention, $p = 0.02$). The researchers noted that not all nurses in the intervention group were exposed to the EWR, resulting in a limitation to the study, but concluded that the results indicated a positive effect of the EWR on safety attitudes of nurses who were present for the intervention.

Information Technology

The literature also supports the investigation of technological supports for patient safety initiatives. The importance of information technology as a component of patient safety has been demonstrated in a survey implemented by the Healthcare Information and Management Systems Society (HIMSS, 2003). In the spring of 2003, HIMSS conducted a Web-based survey of 247 senior-level executives, department heads, and managers from health care provider organizations. More than 90% of the respondents worked in hospital settings. Findings indicated that nearly all of the survey respondents (99%) believed that technology can address at least one patient safety issue. Of these issues, medication errors (93%), excessive time on administrative tasks (54%), quality of care (42%), and variability of care (40%) were the most frequently cited. When asked what technologies would improve patient care, bar codes for medication administration was most frequently cited (80%), followed by computerized provider order entry (76%). However, only 19% of the organizations had implemented bar codes for medication administration and 21% had implemented computerized provider order entry systems.

Other technologies that had better implementation rates include reporting systems for patient safety (53%), Web access to patient information (55%), and automated medication cabinets (55%). On a self-assessment of their organizations' preparation for patient safety, the average response was 4.38 (1 = not at all prepared, 7 = completely prepared). The researchers concluded that responses indicate that technology is important and that hospitals are becoming committed to utilizing technology for improving patient safety (HIMSS, 2003).

In contrast to findings in the study by HIMSS that indicate broad support for increasing technologies in health care to address patient safety, research shows that there are some unintended consequences of technology. Using a qualitative design, Ash, Berc, and Coiera (2003) reviewed the literature and numerous qualitative studies and found two categories of error that occur at the interface of humans and patient care information systems: errors in the process of entering and retrieving information and errors from information systems that affect the communication and coordination of events and activities. In the first category of error, the researchers found that busy health care environments, with frequent interruptions, are not conducive to computer data entry. Another problem is the technical expertise needed to select the correct patient care treatment. For instance, one physician claimed that it was too easy to click on the wrong treatment option instead of the correct treatment option. Other problems occur when orders are entered into the system for the wrong patient. Most health care providers have been trained to evaluate patients with free text, and forced data entry into coded or structured formats can be time consuming and burdensome. Switching from screen to screen to access patient information also impeded health care providers' ability to acquire and maintain an overview of the case (Ash et al., 2003).

In the second category of error, Ash et al. (2003) found factors that influenced the communication and coordination of information systems that may impede safe care. Information systems are structured on a chain of predictable, ordered events, but health care processes are very fluid and flexible. For example, one nurse could not give an urgent medication to a patient because the physician had not entered the order on the computer. In another example, a drug had been ordered three times a day but one dose had already been given, so the system would not allow the nurse to chart the medication because the system considered it an incomplete task. Other issues with coordination include “workarounds,” which allow users to circumvent some of the demands of the system. These shortcuts may lead to patient safety issues such as multiple or repetitive orders.

In addition to identifying issues with information technology in the review of the literature and qualitative studies, the researchers also found ways to address these problems. Educating health care providers, ensuring that vendors clarify limitations in their information systems, and continuing to research the problem were some of the suggestions (Ash et al., 2003).

Patient Perspectives

What about the patient’s viewpoint on contributions to error? In a descriptive study that solicited patients’ perspectives on quality care and medical error, 21 patients from three clinics were interviewed and asked to “tell their stories” in focus groups (Dowell, Manwell, Maguire, An, Paluch, & Felix, 2005).

The researchers used a qualitative study with a standardized questionnaire to capture the respondents’ input. All but 2% of 187 distinct comments could be grouped into four categories: system issues, interpersonal skills, knowledge/technical skills, and errors. The results indicated that the majority of the comments (44%) related to system

issues such as a lack of access, long waits, understaffing, and underfunding. Interpersonal skills (37%), knowledge and technical skills (9%), and errors (7%) were also acknowledged. This study indicates that patients are concerned about system contributions to quality and error (Dowell et al., 2005).

In summary, studies regarding system contributions to error events reflect that staffing methodologies do affect patient morbidity and mortality (Blegan et al., 1998; Aiken et al., 2002; Potter et al., 2003). Organizational cultures that blame, do not promote trust, and lack standardization in reporting systems can impose barriers to effective error-reduction strategies (Atkins, 2004; Barach & Small, 2000), while mitigating or proactive measures include creating incentives to report errors, developing reporting systems that are trustworthy and reliable, and demonstrating the leadership's commitment to patient safety through executive walk rounds (Barach & Small, 2000; Thomas et al., 2005). The role of information technology regarding patient safety, though promising, has limitations (HIMSS, 2003; Ash et al., 2003), and patients are concerned about system contributions to medical errors (Dowell et al., 2005).

SUMMARY

The literature reflects emerging evidence to support the relational nature of individual, team, patient, and system factors that contribute to threats to patient safety. All of the studies found in the literature were descriptive and exploratory in nature except for two intervention studies that evaluated the effect of an educational program and a leadership outreach effort to enhance an organization's safety culture. The prevalence of exploratory and descriptive studies reflects the preliminary state of the science of patient safety and medical error and supports the descriptive design of the research study. Researchers are still trying to identify and name the phenomena as evidenced by the prominence of taxonomies and classification systems in the literature. The lack of

reporting of the reliability and validity of research instruments is concerning, particularly because these studies were accessed from AHRQ, CINAHL, and Medline.

A review of the error classification systems indicates that there are emerging scientific methods to collect and analyze information about errors. The missing link in the literature concerning these systems is a discussion of the compelling reasons organizations will use them. Although the Patient Safety and Quality Improvement Act of 2005 encourages error reporting, it does not mandate such. Some states do require error reporting, and state-by-state endorsement may be the means to require organizations to report errors (Rosenthal & Booth, 2004). However, this raises questions about the ability to interface and compare findings among different reporting systems. What is apparent is that a common, broad-based repository such as the PSET or AIMS is in order. However, this does not negate the need for specialized reporting systems such as the TERCAP or MEDMARX systems.

The PSET is being promoted by the NQF to serve as the common repository for disparate reporting systems. This endorsement is interesting in light of political factors as well as the scientific merits that must be considered in the selection of a reporting system that will serve as the common repository. For instance, how would the PSET interface with the patient safety organizations identified in the Patient Safety and Quality Improvement Act of 2005? Would the PSET be accepted and endorsed by other organizations to serve as a national repository for the reporting and analysis of errors? Gaining the NQF's endorsement may be the first step in developing the political agenda needed to endorse the PSET.

To date, the TERCAP is the only classification system found in the literature that was specifically designed to analyze nursing errors. However, the literature makes it clear that collecting information about nursing errors through taxonomies and classification

systems should not be done in a vacuum. The profession should look to colleagues within the health care organizational research arena and collaboratively translate the concept of nursing error into measurable phenomena. This collaboration should provide special disciplinary considerations within an overarching framework for understanding, classifying, and eventually managing errors to promote safe and best practices for all health care professionals.

In reviewing the individual health care practitioner characteristics that contribute to threats to safety, the literature provides strong evidence that human behavior is complex and that, in order to understand individual contributions to error, the etiology of why humans make errors is important. Although most health care professionals will not have the depth of knowledge of a cognitive psychologist, an introduction to the discreet phenomena in human performance behaviors can contribute to a better understanding of the “why” in error commission. Additionally, a better understanding of human factors science in researching error commission in health care will promote a more objective view of the individual practitioner’s contribution to error. It is well documented that health care cultures often “shame and blame” individuals who make mistakes (IOM, 2000, 2004), and human factors science may contribute to methodologies that anticipate and mediate human fallibility.

The review of the literature indicates that research is needed to better understand how unprofessional conduct by health care providers affects patient safety. This need has prompted the NCSBN to develop and operate the TERCAP as a classification system for all boards of nursing. State boards are rich sources of data about nursing errors, and the development of a classification system that identifies the breakdown of practice standards involved in nursing errors will provide an analysis and a better understanding of how the profession can educate, regulate, and monitor its licensees.

The literature concerning characteristics of health care teams that create threats to patient safety unequivocally reflects issues concerning the lack of effective and comprehensive communication amongst the teams. This emphasis is found in both aviation and health care research. The issue is complex, and causal relationships may be difficult to ascertain. As researchers in health care have looked to aviation for new knowledge and understanding about safety, perhaps they should also reach out to professionals that specialize in information, communication, and social sciences.

Further research in patient characteristics that pose threats to safety could contribute to a better understanding of a patient's clinical condition and its relationship to error. Strong relationships between clinical conditions and error may lead to the development of error-management strategies and provide a template of high-alert factors to be assessed, identified, and managed. A better understanding of methods to address safety issues posed by language barriers with patients is particularly important in light of the growing cultural diversity of this country. The research also indicates that both patients and health care providers believe that patient education is important in promoting safety.

Given that health care organizations are complex systems with multifaceted variables and relationships, a review of the literature provides evidence of the use of complex research methodologies and data sets to evaluate system components of error. For instance, using a methodology called dynamic econometric modeling, McCue, Mark, and Harless (2003) examined the relationships among nurse staffing, quality of care, and financial performance. The researchers sampled 422 hospitals and utilized data from several extensive data sets from the Healthcare Cost and Utilization Project (HCUP); the American Hospital Association's annual survey; the Center for Medicaid and Medicare Services' (CMS) minimum cost and capital file, provider of services file, and case mix

index file; and the Online Survey Certification and Reporting (OSCAR) system. These types of studies may provide methods to begin to explore and understand causal relationships.

Chapter 3: Methodology

RESEARCH DESIGN

This exploratory study was conducted using a descriptive survey research design. Variables in the study include the following:

1. Threats – Individual, health care team, patient, and system factors
2. Errors – A breakdown in medication administration, documentation, attentiveness/surveillance, clinical evaluation, prevention, intervention, interpretation of doctors' orders, and patient advocacy
3. Patient Outcomes – Level of harm

The modified TERCAP was used to collect information about these variables and provided a unique opportunity to analyze descriptive data from nurses who had been sanctioned by a board of nursing. This instrument may provide a standardized framework for collecting and analyzing information gathered by boards of nursing. In addition to studying the descriptive data, correlations between nursing errors and patient outcomes were analyzed to explore relationships between types of nursing errors and the level of harm to the patient. The study's nonexperimental methodology is appropriate because of the limited empiric knowledge regarding patient safety (Polit & Beck, 2004).

POPULATION AND SAMPLE

The study population consisted of RNs in Texas who received a disciplinary order from the BNE because of a nursing practice error. As of December 2006, there were 613 RNs in the BNE database who had received a sanction from the BNE for practice errors since December 2004. These nurses received a sanction from the BNE for violations of the Nursing Practice Act, Section 301.452 (b)(10)(13), Rule 217.12 (1)(4), which

specifies that a person will be disciplined “for failing to care adequately for a patient or to conform to the minimum standards of acceptable nursing practice in a manner that, in the Board’s opinion, exposes a patient or other person unnecessarily to risk of harm or exhibiting unprofessional conduct by engaging in unsafe practice” (Nursing Practice Act, 2005, no p.).

The entire population described above composed the sample that was surveyed. Using a power analysis for correlational studies with a hypothesized medium effect size, power of 0.80 and an alpha of 0.05, a total sample size of 86 was recommended to detect a significant correlation assuring a moderate effect size (Elashoff, 2002). Criteria for the selection of participants included an RN license in Texas and a sanction ordered by the board of nursing for a practice error from December 2004 to December 2006. Exclusion criteria that restricted the sample included licensure as an LVN and sanctions of RNs concerning substance abuse, mental illness, moral turpitude, or criminal behavior. Considering the average response rate of 20% to 30% with mailed surveys, it was projected that the sample size described above would be adequate (Prairie Research Associates, 2006).

INSTRUMENT

TERCAP

As noted in Chapter 2, there are several classification systems that categorize medical errors. A modified version of the TERCAP classification system was used as the survey instrument in this study. This instrument is appropriate for the study not only because it was developed for nurses, but also because it captures individual, health care team, patient, and system contributions to error. As such, the modified instrument reflects major constructs of the TEMM, and using it in this study may promote new knowledge

for patient safety theory development. As a taxonomy of nursing error, the TERCAP may also prove beneficial for the global repository proposed by the PSET (as discussed in Chapter 2) in providing a discipline-specific taxonomy for tracking and monitoring nursing errors.

The TERCAP was specifically developed for classifying nursing errors by identifying categories of breakdown in practice within the context of commonly accepted nursing practice standards and good practice (Benner et al., 2006). The practice breakdown categories were inductively developed by analyzing 21 disciplinary cases from nine state boards of nursing (Benner et al., 2002).

The purpose of the TERCAP is to collect and analyze error data relating to discipline cases taken by state boards of nursing. The goal of the TERCAP is to improve the effectiveness of nursing regulation through a standardized taxonomy of nursing error (Malloch, 2004). Ideally, the aggregation of data from all state boards of nursing will lead to new knowledge and contribute to error-prevention strategies. These strategies could be embraced by schools of nursing and employers of nurses to help promote safety and reduce nursing errors (Benner et al., 2002).

There are eight major sections in the TERCAP instrument:

Patient Profile	Health Care Team
Patient Outcome	Nurse Profile
Setting	Intentional Misconduct/Criminal Behavior
Systems Issues	Practice Breakdown

The Practice Breakdown section is the taxonomy of eight types of nursing errors:

Medication Administration	Prevention
Documentation	Intervention
Attentiveness/Surveillance	Clinical Reasoning
Interpretation of Authorized Providers' Orders	Professional Responsibility/Patient Advocacy

The TERCAP is an online database that is housed within the NCSBN. The database is available to investigators of all state boards of nursing for the collection and analysis of nursing threats and errors. Included in the TERCAP is an inventory of factors related to nursing practice breakdown or errors. Board staff can use the inventory to select appropriate response options or write in answers for responses marked “Other, please specify.” The 60 items in the instrument yield primarily nominal data, except for the demographic data section and the patient outcome section, which yields ordinal data. Also included is a harm index that ranks the patient outcome from the error, ranging from no harm to death.

Validity of the TERCAP was examined through ongoing and comprehensive expert evaluation between 1999 and 2006 (NCSBN, 2006). The development and evaluation of the instrument was conducted through the review and analysis from staff of state boards of nursing (such as the researcher), board members of state boards of nursing, and other nursing practice experts such as Dr. Patricia Benner and Dr. Marie Farrell. Because the TERCAP is a categorical instrument that collects primarily nominal data, Cohen’s kappa was used to estimate evidence for reliability. The statistical analysis resulted in a coefficient of 0.75. Currently, the NSCBN is testing the TERCAP at several state boards of nursing across the country.

Modified TERCAP

The TERCAP is a database that can be used to investigate extensive information to determine possible disciplinary and remedial action. For the purposes of this study, key components of the database were utilized to design a survey to obtain important descriptive data and to gain the perspective of the sanctioned nurse regarding contributing factors to the error event. Initial modifications were made by the researcher to condense the number of items, personalize the language, and eliminate items not pertinent to the present study.

PROCEDURES FOR DATA COLLECTION

Modifying and Testing the Modified TERCAP

The first phase of the study required an independent IRB review and approval to conduct cognitive interviews to modify the instrument and implement test-retest measures to evaluate evidence of reliability. Cognitive interviewing is a process used for survey development by studying how targeted groups understand, mentally process, and respond to information given to them (Willis, 2005). By questioning the participants about each item on the instrument, the researcher is able to evaluate potential problems in the instrument (Willis). Willis states that between 5 and 15 participants should be interviewed before the findings are reviewed and interpreted.

Cognitive interviews were conducted with five RNs who currently serve or who served in the recent past as direct patient care providers, thus reflecting the demographics of the nurses participating in the full study. The researcher mailed the modified instrument to the participants and asked them to review it thoroughly. After the RNs reviewed the instrument, the researcher conducted interviews to review the instrument, documenting the participants' input and insights about their understanding of each item.

A list of questions was developed to explore the participants' understanding of the perceived purpose of the survey instrument, clarity, applicability, and the appropriateness of each item. Participants were also questioned about terms that might better describe items in the instrument. For example, they were queried about the terms for practice errors such as *practice breakdown*, *practice incident*, or *error event*. Most of the participants did not like the term *practice breakdown* because of its negative connotation, although it is predominantly used in the TERCAP. In response to the negativity voiced by the participants concerning the Practice Breakdown item, which is the taxonomy of error, the item was renamed Eight Standards of Practice. The descriptor under the item contained an explanation of the standard and a subsequent question asking if there was an issue in meeting the standard that contributed to the error event. Originally, the Practice Breakdown section was listed as a simple, dichotomous checklist to check yes or no if the applicable error was involved. However, during the cognitive interviewing process, the respondents were asked whether the dichotomous response should be expanded to provide more response alternatives. Feedback from the interviews reflected that participants wanted an opportunity to rate the degree to which each error contributed to the incident rather than choosing only whether or not a type of error contributed to the problem.

Once the interviews were completed and modifications made to the instrument, its reliability was explored using a test-retest method administered to 10 RNs meeting the same demographic criteria of the study sample. This approach is used to explore reliability in self-rating instruments by evaluating consistency of responses (Streiner & Norman, 2004). Time intervals between test and retest ranged from 2 to 14 days (Streiner & Norman, 2004). To conduct the test-retest analysis, the RNs were sent two survey instruments with a case study and asked to complete the surveys based on the case study.

They were asked to complete and return the first survey instrument and then complete the second survey instrument one week after sending in the first survey instrument. All 10 RNs completed the surveys, yielding a statistical review of 20 surveys. The degree of test-retest percent agreement between the nominal level items of the RNs' first and second surveys was evaluated (see Table 1).

Table 1: *Degree of Test-Retest Percent Agreement*

Systems Factors	Health Care Team Factors	Patient Outcome
Communication – 80%	Communication – 70%	Patient Harm - 90%
Environment – 80%	Lack of Teamwork – 70%	
Management – 90%	Inadq. Patient Support – 60%	
Backup and support – 80%	Unwritten Unit Norms – 100%	
Staffing – 90%		
Standards	Individual Contributions	Other System
Clinical Evaluation – 80%	Inexperience – 90%	No Rest/Meal Breaks – 80%
Prevention – 50%	Language Barriers – 90%	Language Barriers – 90%
Intervention – 70%	Drugs/Alcohol – 100%	High Work Volume – 90%
Interpretation of Authorized Providers' Orders – 50%	Fatigue – 80%	Conflict Team – 100%
Documentation – 60%	Mental Health – 100%	Overwhelming Assn. – 70%
Patient Advocacy – 90%		

The majority of the results were within the 60% to 100% range except for the items Prevention (50%) and Interpretation of Authorized Providers Orders (50%). Further investigation on these two items was done using a Spearman's rho correlational analysis. Using SPSS software, a Spearman's rho correlational analysis was conducted to evaluate

the ordinal data in the items concerning patient harm and the eight standards of practice (see Table 2).

Table 2: *Spearman's Rho Analysis of Patient Harm and Practice Standards*

Patient Harm – 0.818	Interpretation of Authorized Providers'
Clinical Evaluation – 0.745	Orders – 0.184
Prevention – 0.608	Documentation – 0.655
Intervention – 0.713	Patient Advocacy – 0.996

With the exception of one item, Interpretation of Authorized Providers' Orders, which had a 0.184 coefficient, all of the Spearman's rho analyses ranged from 0.608 to 0.996. Reasons the item Interpretation of Authorized Providers' Orders was an outlier were evaluated. During the development of the TERCAP, the original item was named Interpretation of Doctors' Orders but was modified to Interpretation of Authorized Providers' Orders to include orders written by advanced practice nurses, physician's assistants, and other health care providers. It was decided that this language may have been confusing to the participants, and so Interpretation of Authorized Providers' Orders was renamed with the original term, Interpretation of Doctors' Orders. Appendix C contains the finalized instrument that was used in this study.

Implementation of the Study

Once the instrument was modified by cognitive interviews, test-retested for evidence of reliability, and approved by the Internal Review Board, the study was implemented beginning with the selection of the sample. The BNE Information Technology Specialist assisted by obtaining a list of all RNs who had received a sanction

for a practice error between December 2004 and December 2006. The information in the database used is public as outlined in the Nursing Practice Act, Section 301.466, which clarifies that formal charges against the nurse and disciplinary actions are not confidential. Subchapters B and C of Chapter 552 of the Texas Government Code also authorize governmental agencies to share employee addresses and phone numbers. The public may access any of this information through a written request to the BNE.

The BNE maintains this licensure database to support its mission of regulating the practice of nursing. The application, created exclusively for the BNE, was developed using a programming software tool called PowerBuilder. The licensure data is stored in a Microsoft SQL database. The Case Log Maintenance module tracks complaints made against nurses. The system is used to notify the complainant and the nurse of an ongoing investigation, assist investigators in tracking the progress of the investigation, and record the results of the investigation, including board action and violations of the Nursing Practice Act.

In the sample selection process, the database was queried for Nursing Practice Act violations of nursing practice. The resulting list of sanctioned nurses was used as the study's population. The only information that was used from the file containing the sample was the mailing addresses of sanctioned RNs, who were mailed a survey through the U.S. Postal Service. The accompanying cover letter asked for a voluntary, anonymous response. The address list was kept confidential in a locked file, and no one other than the researcher and information technology specialist viewed it. The list was destroyed once the surveys were mailed.

All of the RNs in the sample were mailed a cover letter outlining the purpose and the voluntary and confidential nature of the study, which is included in Appendix D. In addition to the cover letter, a copy of the survey and a self-addressed, stamped envelope

were included. The return address was the researcher's private P.O. box, provided solely for the purpose of this study. All of the outlined correspondence was sent to the participants' mailing addresses to foster a sense of privacy and facilitate participation (Polit & Beck, 2004). The researcher collected the surveys daily and kept them in a secure office in a locked cabinet. Respondents were given two weeks to respond to the initial mailing. A reminder was sent two weeks after the initial mailing, again requesting participation and offering a two-week extension of the return date. After the timeline expired, the researcher began the analysis process.

STATISTICAL ANALYSIS

Data from the surveys was entered into the SPSS Version 13 Data Analysis Program and Excel 2003. All descriptive and correlational analyses were conducted with these programs. The analyses included demographic data of the characteristics of the RN sample (age, education, years of licensure, etc.); data identified as system, health care team, patient, and individual factors involved in the error event; ordinal data reflecting the level of harm to the patient, and ordinal data ranking the level of breakdown in the nursing practice standard.

Due to the types of data and commonly accepted rules of statistical analysis, nonparametric analyses were conducted on all five of the research questions, as follows:

1. What is the demographic profile of RNs sanctioned by the BNE?

Excel was utilized to compute frequency distributions and percentages of demographics of the sample.

2. What are the incidences of individual, health care team, patient, and system threats and types of nursing errors reported by sanctioned nurses?

Excel was utilized to compute frequency distributions and percentages to describe the types of nursing errors, patient outcomes, and individual, patient, health care team, and system threats.

3. What are the incidences of the level of harm to the patient as reported by sanctioned nurses?

Excel was utilized to compute frequency distributions and percentages to describe the levels of harm to the patient.

4. What relationships exist between the types of errors and the level of harm to the patient as reported by sanctioned nurses?

SPSS was utilized to implement a Spearman's rho correlational analysis of the ordinal data within the items capturing the type of nursing error and level of patient harm.

5. What changes in practice do RNs sanctioned by the BNE describe after the error event, and what suggestions do they have for other nurses in preventing error events?

Two open-ended questions were included in the modified TERCAP. These questions were, "Did the event change your nursing practice and, if so, how?" and "Based on what you have learned from the event, what suggestions would you pass on to help other nurses prevent practice breakdown and/or error events?" Analysis was conducted by coding the responses to these questions and developing themes related to the content (Rubin & Rubin, 1995).

PROTECTION AND CONSENT OF PARTICIPANTS

Before any data were collected, The University of Texas at Austin IRB and the Departmental Research Committee of the School of Nursing were asked to approve the study (Appendix E). IRB approval was obtained before implementation of the study (Appendix F). Once the survey instruments were returned, the mailing list was destroyed.

As outlined in the cover letter, completion and return of the instrument implied informed consent by the RNs. In an effort to promote privacy, the survey instruments were mailed to the respondents' personal addresses. The respondents were apprised of the approximate time frame allowed for completion of the survey. Respondents were supplied with a stamped envelope to return the survey to the researcher's private P.O. box. This mailbox was checked daily, and the survey instruments were kept in a secure office in a locked cabinet and destroyed once the study was completed.

Chapter 4: Presentation, Analysis, and Findings of the Data

This chapter provides an overview of the results of the study. The data is presented in six sections: the first section provides a description of the sample while the other five sections present data regarding each research question in the study. To promote readability and because the majority of nurses are female, the respondents will be referred to as *she*.

SURVEY RESULTS

Survey Response

The study population consisted of all of the RNs in Texas who received a disciplinary order from the BNE from December 2004 to December 2006 because of a violation of the Nursing Practice Act, Section 301.452 (b)(10)–(13) and Rule 217.12 (1)(4). This comprised a study population of 613 RNs, all of whom were mailed a survey questionnaire. The participants were given two weeks to return the survey. Fifty of these were returned unopened, indicating that the addressee did not live at the mailing address. Ten days after the survey mailing, 45 completed surveys were returned. Subsequently, a postcard reminder was sent to all of the study population, minus the 50 with incorrect addresses. The postcard thanked the RNs for participating in the study and encouraged their participation if they hadn't yet done so. They were given a two-week extension to return the survey. This reminder increased the responses by 17, resulting in 62 completed surveys. This number represents a 10% response rate.

Several factors may have affected the response rate. First, because of the need for informed consent of the participants, the cover letter stated that the researcher was an employee of the BNE as well as a doctoral student. Even though all of the respondents'

cases were settled and not subject to further review and the cover letter assured anonymity, some nurses may have thought that responding might affect their cases, thus dissuading them from participating. Secondly, receiving a sanction from the BNE may have been difficult for the participants, thus limiting their desire to review the experience. Lastly, the NCSBN, an organization that frequently conducts nursing survey research, recently noted that its response rate for a survey of advanced practice nurses was significantly lower (13%) than historical response rates of 40%. In a follow-up survey, the NCSBN randomly selected nurses (N not reported) from the mailing list and asked why they did not participate in the study. The recurring theme from the nurses was that they were “too busy” (NCSBN, 2006); thus, nurses’ feeling too busy may have affected the response rate in this study as well.

To determine whether the sample was representative of the study population, all the demographic information from the respondents was compared with the demographics of the study population (Tables 3–7). Sixty-two surveys were utilized to analyze the demographic data for research question 1. Ten surveys were not included in the analysis of research questions 2, 3, and 4, resulting in the analysis of 52 (84%) of the survey responses. These surveys were eliminated because the respondents indicated that patient care was not a part of their sanctions by the BNE and/or they did not complete the *Patient Profile* and *Patient Outcomes* portions of the survey. Data analysis for research question 5, two open-ended questions related to the participants’ qualitative descriptions of changes in practice resulting from the error event, was composed of 55 (88%) surveys for the first question and 53 surveys (85%) for the second question.

Research Question 1

1. What is the demographic profile of RNs sanctioned by the BNE?

Demographic characteristics of the sample at the time of the error event were analyzed. These characteristics included age, years of licensure, highest educational level, type of facility, assignment (position), whether or not the assignment was temporary, and whether the nurse was terminated or stayed with her employer. Five of these demographic characteristics (age, years of licensure, highest educational level, type of facility, and assignment) were also analyzed to evaluate whether the sample represented the entire population. Each demographic item in the sample and the population was evaluated to determine whether there was a margin of plus or minus 5% between the two groups to identify any notable differences between the sample and the population that might influence the representation of the findings (Heather Becker, personal communication, March 29, 2007). Though the survey response rate was only 10%, an analysis of the data indicated that the majority of the demographics in the sample reflected the population. A review of each of the demographic characteristics of the sample and a comparison with the demographics of the population is presented in Tables 3 through 7.

Table 3 and Table 4 present the data concerning reported age and years of licensure. The respondents' reported ages ranged from 25 to 71 years with a mean age of 47 years and a median age of 48 years. The standard deviation was 10.21 years.

Table 3: *Age of BNE Population Compared With Age of Sample*

	All disciplined nurses		Survey respondents		Over (under) representation
	Number	Percent	Number	Percent	
Less than 25	0	0.00%	0	0.00%	0.00
25–34	65	10.60%	9	14.52%	3.92
35–44	183	29.85%	12	19.35%	(10.50)
45–54	215	35.07%	24	38.71%	3.64
55–64	126	20.55%	15	24.19%	3.64
Over 65	24	3.92%	1	1.61%	(2.31)
No response	0	0.00%	1	1.61%	1.61
Total	613	99.99%	62	99.99%	

Note. Percentages may not add to 100% due to rounding.

As outlined in Table 3, the respondents' ages reflect the population except for the 35–44-year-old cohort, which is underrepresented. Table 4 presents an overview of the number of years the participants reported they had been licensed at the time of the error event. The respondents' reported years of licensure at the time of the event ranged from 9 months to 36 years. The mean for years of licensure was 14 years, the median was 13 years, and the standard deviation was 10 years. The sample represented the population in years of licensure except for the 5–10-year range. Generally, the respondents' ages and years of licensure reflect the population except for the 35–44-year-old cohort and the cohort that had been licensed 5 to 10 years. It may be that experienced nurses were more committed to telling their stories and more hopeful that doing so would improve the profession.

Table 4: *Years Licensed When the Event Occurred*

	All disciplined nurses		Survey respondents		Over (under) representation
	Number	Percent	Number	Percent	
Less than 5 years	131	21.40%	11	17.74%	(3.66%)
5–10 years	183	29.90%	13	20.97%	(8.93%)
11–15 years	127	20.70%	11	17.74%	(2.96%)
16–20 years	64	10.40%	9	14.52%	4.12%
21–25 years	56	9.10%	5	8.06%	(1.04%)
Over 25 years	52	8.50%	9	14.52%	6.02%
No response	0	0.00%	4	6.45%	6.45%
Total	613	100.00%	62	100.00%	

As shown in Table 5, while the largest group in the sample reported they had an Associate Degree in Nursing (ADN), the percentage of ADNs in the total population of disciplined nurses was even higher. The percentage of baccalaureate nurses was essentially the same in both groups. The respondents with ADN education were the only cohort that did not represent the overall population of disciplined RNs in Texas. The reasons nurses with baccalaureate and master's degrees were more represented may relate to nurses with a higher educational level feeling more of a professional obligation to respond to a survey request by a doctoral student. The reason that diploma nurses may be more represented is that typically they are older and more traditional and may have felt more compelled to respond to the survey.

Table 5: *Highest Degree Attained*

	All disciplined nurses		Survey respondents		Over (under) representation
	Number	Percent	Number	Percent	
Unknown	0	0.0%	1	1.6%	1.6%
Diploma	39	6.4%	7	11.3%	4.9%
Associate's	330	53.8%	27	43.5%	(10.3%)
Baccalaureate	194	31.6%	19	30.6%	(1.0%)
Master's	45	7.3%	8	12.9%	5.6%
Ph.D.	5	0.8%	0	0.0%	(0.8%)
Total	613	99.9%	62	99.9%	

Note. Percentages may not add to 100% due to rounding.

The information in Table 6 provides a breakdown of reported country of origin for prelicensure education. The majority reported that they were educated in the United States. However, foreign nurse graduates were slightly overrepresented in the sample.

Table 6: *Prelicensure Education*

	All disciplined nurses		Survey respondents		Over (under) representation
	Number	Percent	Number	Percent	
U.S.	566	92.0%	53	85.0%	(7.0%)
Foreign	35	6.0%	8	13.0%	7.0%
Unknown	12	2.0%	1	2.0%	0.0%
Total	613	100.0%	62	100.0%	

The information in Table 7 shows the respondents' primary places of employment. As noted, the overwhelming majority of survey respondents reported working in a hospital setting. When comparing primary place of employment between the sample and the study population, the labels for categories of employment in the modified TERCAP and the BNE database did not match exactly. For example, the modified TERCAP labeled categories *Ambulatory Care*, *Office Based Surgery*, and *Physician's Office*, while the BNE database contained labels for certain similar categories named *Physician or Dentist Office*, *Rural Health Clinics*, and *Free Standing Clinics*. In order to provide comparisons between the sample and the population, these categories were collapsed and a new category named *Offices and Clinics* was created. Other employment categories in the modified TERCAP such as *Hospitals*, *Home Care*, and *Long-Term Care*, though labeled with slightly different names, matched the BNE database.

As noted, nurses who reported working in the hospital setting were overrepresented in the sample. One reason for this may be that the survey items reflect an acute care model, which may have been more pertinent to hospital employees than others. For example, in the section *System Factors*, there are items such as staffing factors, inadequate patient acuity systems, and environmental factors that might have been more relevant to nurses in a hospital setting.

Table 7: *Place of Employment*

	All disciplined nurses		Survey respondents		Over (under) representation
	Number	Percent	Number	Percent	
Hospitals	334	54.5%	43	69.4%	14.9%
Offices and clinics	27	4.4%	5	8.0%	3.7%
Home care	42	6.9%	6	9.7%	2.8%
Long-term care	51	8.3%	5	8.1%	(0.2%)
Other	127	20.7%	3	4.8%	(15.9%)
No response	32	5.2%	0	0.0%	(5.2%)
Total	613	100.0%	62	100.0%	

Table 8 provides an overview of the assignments or types of positions held by the survey respondents. Not surprisingly, the overwhelming majority of respondents reported that they were direct patient care providers. Though the researcher was able to collapse and modify categories of employment settings between the survey responses and the BNE database, due the large number of categories of positions in the BNE database, this was not possible with positions in the modified TERCAP except for direct patient care providers. The BNE database and the TERCAP were matched with regard to direct patient care providers, and the survey sample was representative of the study population (61.3% of the survey respondents identified themselves as being direct patient care providers while 62.6% of the RNs in the BNE database identified themselves as staff nurses).

Table 8: *Assignment (Position) of Survey Respondents*

	Number	Percentage
Direct patient care provider	38	61 %
Team leader	0	0 %
Charge nurse	6	10 %
Nurse manager/supervisor	4	7 %
Combination patient care/manager	12	19 %
Other	2	3 %
Total	62	100 %

To ascertain whether the nurse was in a permanent versus a temporary position, questions about employment status were included. As shown in Table 9, the majority of the nurses were permanent employees. There is no comparative data within the population of disciplined nurses.

Table 9: *Temporary Employees*

	Number	Percentage
Yes	10	16.0%
No	47	76.0%
No response	5	8.0%
Total	62	100.0%

Information about the nurses' employment status after the error event is provided in Table 10. It is interesting to note that the majority of nurses responded that they were either dismissed or asked to resign in lieu of termination.

Table 10: *Employment Outcomes*

	Number	Percentage
Dismissed or asked to resign	39	63 %
Resigned	6	10 %
Other	1	2 %
Stayed with employer	16	26 %
Total	62	101 %

Note. Percentages may not add to 100% due to rounding.

Research Question 2

2. What are the incidences of individual, health care team, patient and system threats, and types of errors as reported by sanctioned nurses?

As outlined in Chapter 1, the TEMM acknowledges the limitations of humans and systems in the commission of errors and strives for error management rather than error avoidance. The limitations found within humans and systems are called *Threats*. The items in the modified TERCAP support the concepts found in the TEMM; however, instead of being called *Threats*, the instrument items are labeled *Factors*. The following review of the data will utilize the modified TERCAP nomenclature as outlined in the study's definitions.

Table 11 outlines the reported level of patient harm and the incidences of individual, health care team, and system threats in each level of harm. Table 12 reflects

the reported level of patient harm and the incidences of patient factors in each level of harm. Table 13 outlines the reported incidences of each type of error.

In the evaluation of *Individual Factors*, 36 (69%) of the respondents identified at least one factor in their own practice that affected the error event. As noted in Table 11, the two most frequently cited individual factors were *Fatigue* (27%) and *Inexperience* (21%). The most frequent response (5) in the *Other* category was from nurses who felt physically ill at the time of the error event. Though the modified TERCAP included mental illness as an item under *Individual Factors*, it did not have an item for physical illness.

When selecting members of the *Health Care Team* who were involved in the error event, 42 (81%) identified at least one other member of the team. The most frequently selected members of the team were *Staff Nurses* (44%), *Supervisory Nurses* (35%), and *Physicians* (35%). Forty-two (81%) of the respondents also noted at least one factor related to the health care team that contributed to the error. As noted in Table 11, the most frequently identified were *Communication Factors* (54%) and *Lack of Teamwork* (44%). There was only one comment in the *Other* category for *Health Care Team Factors* that provided additional information. This nurse indicated that even though the physicians exonerated her after the error event, she was still reported to the BNE. This comment may reflect a hierarchy gradient where physicians are viewed as the leaders of the health care team and are able to deem what is and is not an error.

System Factors were identified as contributing to errors by 46 (88%) of the respondents. As outlined in Table 11, the two most frequently cited factors were related to *Staffing* (60%) and *Management Issues* (44%). Five statements in the *Other* category provided additional information. Two respondents reported not having access to equipment; two respondents said their employers did not understand pertinent regulatory

rules including the BNE's rules and rules about advanced practice nurses. One respondent felt pressured by her employer to come to work when sick.

Forty-eight (92%) respondents selected at least one item from the *Other System and Team Factors* section of the modified TERCAP. As outlined in Table 11, the two most cited factors were *Lack of Team Support* (58%) and *High Work Volume* (56%). Notable comments in the *Other* category came from one respondent indicating that, because she was the charge nurse, she was blamed even though she wasn't present. The other comment outlined an issue with an Omni-cell (medication dispensing unit) that was stocked with two different IV fluids side by side that looked exactly the same.

The modified TERCAP instrument had three separate sections for *System Factors*, *Health Care Team Factors*, and *Other System and Team Factors*. To ascertain all of the system and health care team factors, these sections were collapsed and analyzed. The majority of the factors identified by the respondents as contributions in their error events were *System Factors* (N = 145) and *Health Care Team Factors* (N = 151), as compared to incidences of *Patient Factors* (N = 86) and *Individual Factors* (N = 47). In those error events that involved some level of patient harm, *System Factors* (N = 47) and *Health Care Team Factors* (N = 42) also composed the majority of identified factors, while *Patient Factors* (N = 33) and *Individual Factors* (N = 18) ranked lower.

Table 12 presents reported patient factors that contributed to the error events. Thirty-nine respondents (75%) indicated that at least one patient factor was involved in the error event. There were no predominant types of patient factors that contributed to errors, however; among the most commonly cited factors were *Altered Consciousness*, *Cognitive Impairment*, and *Communication Difficulties*, all of which would make it difficult for the patient to communicate with the nurse. The three least-reported patient factors were *Insomnia*, *Depression*, and *Sensory Deficits*. Most of the comments (N = 14)

in the *Other* section related to increased patient acuity such as occurs with end-stage renal disease and/or multiple health care problems. Two respondents described problems controlling the patient's pain.

Table 13 provides a breakdown of the eight types of errors. As outlined, the instrument provided a mechanism for the respondent to rank ("did not," "moderately," or "greatly") the contribution of the types of errors to their own error event. Respondents indicated that the majority of errors listed in the modified TERCAP did not contribute to their error events (N = 253 selections for all error types). However, there were 145 selections that indicated the errors either moderately or greatly contributed to the error event. The most frequently selected types of errors were *Documentation* (53.8%) and *Medication Administration* (44.2%). Of the errors that respondents selected as greatly contributing to their error events, again *Documentation* (30.8%) and *Medication Administration* (28.8%) were the most frequently selected. The two most frequently reported errors that moderately contributed to the respondents' error events were *Intervention* (25.0%) and *Documentation* (23.1%).

Table 11: *All Factors by Patient Outcome*

	Patient death <i>n</i> = 7	Significant harm <i>n</i> = 6	Harm <i>n</i> = 5	No harm <i>n</i> = 33	No response <i>n</i> = 1	Grand total <i>n</i> = 52
System factors						
Communication	2	1	1	7	0	11 (21%)
Environmental	2	3	2	7	0	14 (27%)
Management	4	2	0	17	0	23 (44%)
Backup/support	2	4	1	8	0	15 (29%)
Staffing	4	3	3	21	0	31 (60%)
Other	1	0	0	4	0	5 (10%)

Table 11 continued

	Patient death <i>n</i> = 7	Significant harm <i>n</i> = 6	Harm <i>n</i> = 5	No harm <i>n</i> = 33	No response <i>n</i> = 1	Grand total <i>n</i> = 52
Health care team factors						
Communication	3	3	2	19	1	28 (54%)
Lack of teamwork	4	4	0	15	0	23 (44%)
Inadequate pt. support	2	1	0	6	0	9 (17%)
Unwritten unit customs	3	0	0	13	1	17 (33%)
Other	0	0	0	2	0	2 (4%)
Individual nursing factors						
Inexperience	3	3	2	3	0	11 (21%)
Fatigue	2	1	1	10	0	14 (27%)
Mental health issues	1	1	0	2	0	4 (8%)
Language barriers	0	0	0	1	0	1 (2%)
Drug/substance abuse	0	0	1	2	0	3 (6%)
Other	1	1	1	10	1	14 (27%)
Other system and team factors						
No breaks	0	0	0	7	0	7 (13%)
Lack of orientation/ training	1	1	1	7	0	10 (19%)
High work volume	2	4	3	20	0	29(56%)
Conflict w/team	0	1	1	13	0	15 (29%)
Overwhelming assignments	2	2	2	15	0	21 (40%)
Lack of team support	3	4	3	20	0	30 (58%)
Other	2	0	0	4	0	6 (12%)

Table 12: *Patient Factors by Patient Outcome*

Patient factors	Patient death <i>n</i> = 7	Significant harm <i>n</i> = 6	Harm <i>n</i> = 5	No harm <i>n</i> = 33	No response <i>n</i> = 1	Grand total <i>n</i> = 52
Agitation	2	1	1	8	0	12
Altered consciousness	4	1	1	6	1	13
Cognitively impaired	2	2	1	5	0	10
Communication difficulties	1	2	0	6	0	9
Depression	1	0	1	2	0	4
Inadequate coping	1	1	1	8	0	11
Incontinence	2	2	0	4	1	9
Insomnia	1	0	0	3	0	4
Sensory deficits	1	0	0	1	0	2
Other	4	0	0	10	0	14
Total	19	9	5	53	2	

Table 13: *Types of Errors (Issues With Standards of Care)*

	Greatly contributed		Moderately contributed		Did not contribute		No response	
	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.
Medication administration	15	29%	8	15%	27	52%	2	4%
Documentation	16	31%	12	23%	21	40%	3	6%
Attentiveness/surveillance	10	19%	6	12%	34	65%	2	4%
Clinical evaluation	8	15%	8	15%	34	65%	2	4%
Prevention	6	12%	5	10%	39	75%	2	4%
Intervention	6	12%	13	25%	30	58%	3	6%
Interpretation of doctors' orders	13	25%	5	10%	32	62%	2	4%
Patient advocacy	6	12%	8	15%	36	69%	2	4%

Research Question 3

3. What are the incidences of the level of harm to the patient as reported by sanctioned nurses?

Table 11 provides descriptive data about the incidences of the level of patient harm according to system, health care team, and individual factors. As shown, 33 respondents (63%) noted that there was no harm from the error, while 13 respondents (25%) reported that the error resulted in significant patient harm or death. To delineate this further, 13% of the nurses reported errors that may have caused a patient's death, while 12% reported errors that caused significant harm. Among the errors that *did not* result in patient harm, the most frequently cited contributing factors were found within *Other System and Team Factors* (37%), while the least frequently cited factors were

Individual Nursing Factors (12%). Of the 13 respondents who reported that their errors resulted in significant patient harm or death, the most frequently cited factors were *System Factors* (34%) and the least frequently cited were *Individual Nursing Factors* (16%).

The information presented in Table 12 outlines the respondents' ranking of the level of patient harm and the patient factors (behaviors) that may have contributed to the error. Of interest is the mean number of times a patient factor was selected according to the patient's outcome. For example, reported errors that resulted in a patient death had a mean of 2.7 patient-related factors. Patients who were significantly harmed had a mean of 1.5 factors, while patients with harm had a mean of 1 factor. These frequencies may be related to the acuity of the patients rendering them more vulnerable and prone to poorer outcomes. Table 14 provides descriptive data of the patients' reported ages and the level of harm, which indicates that the largest group of patients was elderly. Those who died were fairly evenly split between children, adults and the elderly.

Table 14: *Patient Outcome by Age*

Patient age	Patient death <i>n</i> = 7	Significant harm <i>n</i> = 6	Harm <i>n</i> = 5	No harm <i>n</i> = 33	No response <i>n</i> = 1	Total <i>n</i> = 52
Infant				2		2
Child	2			1	1	4
Adolescent		1		2		3
Adult	2	2	2	12		18
Elderly	3	3	2	14		22
No response			1	2		3
Total	7 (13%)	6 (12%)	5 (10%)	33 (63%)	1 (2%)	52

Research Question 4

4. What relationships exist between the types of errors and the level of harm to the patient as reported by sanctioned nurses?

A Spearman's rho analysis is provided in Table 15. As shown, there was a significant correlation between the patient outcome and two types of errors: *Clinical Evaluation* (0.35, $p = 0.05$) and *Attentiveness/Surveillance* (0.31, $p = 0.05$). Of interest is that there was also a notable but not significant inverse relationship between the level of the patient outcome and two certain types of errors—*Medication Administration* (−0.24) and *Interpretation of Doctors' Orders* (−0.13). This inverse relationship may be due to both of these types of errors having the fewest incidences of patient outcomes that contributed to death or serious harm while also being among the most frequently identified types of errors.

Table 15: *Relationship Between Types of Errors and Patient Outcome (N = 50)*

Spearman's rho correlations

		Outcome	Medication admin.	Documen- tation	Attentive- ness	Clinical evaluation	Preven- tion	Interven- tion	Doctors' orders	Patient advocacy
Outcome	Correlation coefficient	1								
	Sig. (2-tailed)	.								
Medication admin.	Correlation coefficient	-0.24	1							
	Sig. (2-tailed)	0.09	.							
Documentation	Correlation coefficient	-0.09	-0.00	1						
	Sig. (2-tailed)	0.55	0.99	.						
Attentiveness	Correlation coefficient	0.31*	0.04	0.22	1					
	Sig. (2-tailed)	0.03	0.77	0.12	.					
Clinical evaluation	Correlation coefficient	0.35*	-0.08	0.32*	0.64**	1				
	Sig. (2-tailed)	0.01	0.60	0.03	0	.				
Prevention	Correlation coefficient	-0.03	0.08	0.12	0.29*	0.28*	1			
	Sig. (2-tailed)	0.85	0.61	0.41	0.04	0.05	.			
Intervention	Correlation coefficient	0.00	0.16	0.23	0.35*	0.43**	0.31*	1		
	Sig. (2-tailed)	0.99	0.26	0.12	0.01	0.00	0.03	.		
Doctors' orders	Correlation coefficient	-0.13	-0.03	0.26	0.21	0.26	-0.06	0.18	1	
	Sig. (2-tailed)	0.39	0.85	0.07	0.16	0.07	0.66	0.23	.	
Patient advocacy	Correlation coefficient	0.01	0.03	0.27	0.41**	0.41**	0.18	0.64**	0.29*	1
	Sig. (2-tailed)	0.96	0.85	0.06	0.00	0.00	0.22	0	0.05	.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

In an effort to investigate other types of relationships between patient outcomes and types of error, the researcher reviewed whether the reported error greatly or moderately contributed to the error event. Table 16 reflects this information. Respondents indicated that the majority of errors did not cause harm. For those errors that harmed a patient or may have lead to their death, there was an even distribution of frequencies between the categories, *Documentation*, *Attentiveness*, *Clinical Evaluation* and *Intervention* and the categories *Medication Administration*, *Prevention*, *MD Orders* and *Patient Advocacy*. It was interesting to note that there were many more incidences of errors that caused patient death or significant patient harm than those errors that caused harm alone.

Table 16: *Types of Errors (by Degree of Contribution) and Patient Outcomes*

	Patient Death <i>n</i> = 7		Significant Harm <i>n</i> = 6		Harm <i>n</i> = 5		No Harm <i>n</i> = 33		Total
	Great	Mod.	Great	Mod.	Great	Mod.	Great	Mod.	
Medication administration	1	0	2	1	1	0	11	7	23
Documentation	1	3	3	1	1	0	11	8	28
Attentiveness	2	1	4	1	0	1	4	3	16
Clinical evaluation	1	2	3	3	0	1	4	2	16
Prevention	1	0	0	2	0	1	5	2	11
Intervention	5	1	1	3	0	1	4	8	23
MD orders	3	0	1	0	0	0	9	5	18
Patient advocacy	0	2	2	1	0	0	4	5	14
TOTAL	14	9	16	12	2	4	52	40	

Note. "Great" means "greatly contributed," and "Mod." means "moderately contributed."

Research Question 5

5. What changes in practice do RNs sanctioned by the BNE describe after the error event, and what suggestions do they have for other nurses in preventing error events?

Research question 5 provided qualitative data from two open-ended questions in the instrument. Because the modified TERCAP is a quantitative instrument, it was determined that adding two open-ended questions would provide a mechanism to capture the RNs' perceptions of contributions to errors by using their own words. The benefit of using the participants' narratives is that it provides a much more comprehensive and multifaceted perspective on the research topic (Polit & Beck, 2004).

The two open-ended questions were the following:

1. Did this event change your practice and if so, how?
2. Based on what you learned from the event, what suggestions would you pass on to help other nurses prevent practice breakdown and/or error events?

Of the 62 respondents, 55 (88%) responded to the first question and 53 (85%) to the second, giving 170 comments that provided the opportunity to identify common themes. The responses were comprehensive and provided rich information supporting the investigation of recurring themes. These themes were initially developed from the items in the modified TERCAP instrument, which depicts concepts contained in the TEMM as outlined in Chapter 1. This method supports the iterative process important for testing models and building theories (Rubin & Rubin, 1995). Additional themes were developed from narratives that did not fit into the conceptual model provided by the TEMM and the modified TERCAP. Table 17 and Table 18 provide an overview of the open-ended questions.

Question 1: Did this event change your practice, and if so, how?

Table 17 outlines 85 responses regarding whether the event changed the RNs' practice. Initially, these responses were categorized under the themes found in the modified TERCAP, including *Assessment of System Factors*, *Health Care Team Factors*, *Individual Factors*, *Other System and Health Care Team Factors*, and *Eight Standards of Practice*. Four (5%) of the participants indicated that the event did not change their practice. In research question one, there were no responses that related to *System Factors* and only one related to *Patient Factors*.

Changes in Practice Related to Health Care Team Factors

As shown in Table 17, there were 18 responses related to *Health Care Team Factors*, including comments related to specific members of the team. Though the instrument provides nine categories of health care personnel who may be involved in error events, only two members of the health care team, physicians and staff nurses, were identified with changes in practice. Two respondents said that they were less trusting of physicians because of ethical issues and problems with verbal orders. Four respondents reported they were less trusting of other nurses, primarily coworkers. Two of these respondents commented that "nurses eat their own." This theme of mistrust also emerged from five comments by respondents that indicated a global mistrust since the error event. Of these five responses, two respondents commented, "I do not trust anyone." One respondent described a lack of trust because of staff questioning her ability. One individual reported that she no longer trusts the profession in general, and another stated, "You never know who will turn on you." In conjunction with trust issues, conflict with the team was also reported by three respondents. One of these individuals characterized the event as resulting in "a black mark made against me." Similar concerns were voiced by the other two respondents, who indicated that people "twist words," "make life

miserable,” and “treat you like an enemy and outsider.” On the other hand, one respondent did verbalize the importance of trusting all members of the health care team. The need for trust may also have been considered by four respondents whose comments supported the need for *Greater Team Work* since the error event. One of these individuals emphasized the importance of seeking aid from trusted coworkers. Two respondents stressed the importance of working with *every* member of the health care team, and one also suggested supporting the next shift. Communication with peers and nursing administration was also endorsed by one respondent. One respondent indicated that she was less apt to go by unwritten protocols and now calls the MD first.

Table 17: *Summary of Respondents’ Comments to the Question, “Did This Event Change Your Practice, and If So, How?”*

Categories of the modified TERCAP/other themes	Number of comments
Changes in practice relating to health care team members	6
Physicians – less trusting of	2
Staff nurses – less trusting of	4
Changes in practice relating to health care team factors	12
Greater teamwork	4
Conflict with team	3
Additional themes for health care team factors:	
Don’t trust others	5

Table 17 continued

Categories of the modified TERCAP/other themes	Number of comments
Changes in practice relating to individual factors	40
Substance abuse	3
Mental health	3
Additional themes for individual factors:	
Increased self-reliance:	
I trust myself to do the right thing	7
If I don't feel confident, I don't do it	4
Increased my education	2
Reduced self-confidence	9
Slowed down and reduced stress	3
Know and follow the rules	3
Humbled/know I can't handle it all	2
Someone else's fault	4
Changes in practice relating to patient factors	1
Changes in practice relating to specific types of error	11
Documentation	8
Attentiveness/surveillance	2
Interpretation of doctors' orders	1
Did not change my practice	4
No longer work in nursing	11
Total number of comments	85

Changes in Practice Related to Individual Factors

Table 17 outlines 40 responses related to changes the individuals made in their practice after the error events. Of these comments, only six were related to items

identified in the TERCAP, which included *Substance Abuse* and *Mental Health*. All of the other comments required the development of additional themes, reflecting the richness and complexity of the RNs' responses to how their practice changed after the error events. Within the theme *Substance Abuse*, three comments were made. One person simply stated that it was an issue. One respondent commented that her immaturity and marital problems contributed to her issues. One respondent, stating that she had become addicted to pain medications, said "I can't blame the situation on anyone or anything else" and claimed that nurses need an outlet to vent without fear of retaliation.

There were three themes concerning mental health issues. One respondent said she was in therapy for six months after the event. This person stated that she now has a safe job and that "it has been a long journey." One nurse stated that she got depressed and lost her license. She wants to get it back but can't because of "forces that human beings create." One nurse described the event as taking a "psychological toll."

Seven additional themes emerged relating individual factors. Of particular interest were comments that portrayed two opposing themes, the first being *Increased Self-Reliance* and the second being *Reduced Sense of Confidence*, related to not trusting oneself and being more fearful and cautious. Eleven statements supported the theme *Increased Self-Reliance*, with seven nurses advocating for a sense of trust in oneself to do the right thing and four describing not doing things in their practice they don't feel confident to do. Within the theme *I trust myself to do the right thing*, two respondents reported trusting their instincts more. Three nurses described gaining confidence and being more assertive and diligent. One participant said that since the event, she directly confronts a situation, while another stated that she now protects her license. There were four statements concerning the theme *If I don't feel confident, I don't do it*. One respondent stated that she would abort a study or cancel a procedure if "everything is not

in its place.” Two respondents reported having learned to say no, including refusing assignments if they are unsure or uncomfortable. One respondent learned “I should not bite off more than I can chew.” All of the comments in *Increased Self Reliance* indicated that, subsequent to the error event, the respondents felt more empowered and confident to do the right thing.

There were nine comments reflecting the theme *Reduced Sense of Confidence* where respondents indicated they had lost trust in themselves since the error events. Two of these respondents said that they were fearful since the event. Three respondents said they were much more cautious since the event. One respondent said that the event “made me second guess myself.” Two respondents described themselves as being extremely careful and hesitant. The last respondent who commented on this theme reported that she does not volunteer to do anything that is not absolutely necessary.

Other themes emerged related to the respondents’ recognizing changes in themselves. For example, three respondents realized that since the error events, they had *Slowed Down and Reduced Stress* in their lives. Three respondents also discussed *Knowing and Following Rules*, such as knowing the five rights of medication administration and adhering to professional boundaries. Another theme, *Humbled/Know I Can’t Handle It All*, emerged from two respondents, both advanced practice nurses.

An interesting theme, *Someone Else’s Fault*, emerged from four respondents’ narratives describing the error events as not being their fault but perpetuated by others. One nurse indicated that she “took the fall” while another said that the error occurred because the director of nursing “called the shots.” One respondent said the error event made her realize there is “such a term as discrimination.” One nurse listed all of the good things she had done and all the bad things others had done (such as sleeping on the job) and commented that she was “a good nurse, not like other nurses.”

Changes in Practice Related to Patient Factors

Only one respondent described an error event involving a patient. The theme of *Agitation/Combativeness* was captured in the modified TERCAP *Patient Profile* section. This respondent reported having a fear of being harmed by a patient. After the event, she did not want to practice nursing for a while and feared working with persons who had mental illness.

Change in Practice Related to Types of Errors

Table 17 outlines 11 responses related to changes in practice according to the type of error. The *Eight Standards of Practice* section in the modified TERCAP provided information related to issues in meeting the standard that contributed to the error event. The types of errors identified by the respondents were *Documentation*, *Attentiveness/Surveillance*, and *Interpretation of Doctors' Orders*. Of the group who identified types of errors, the majority (8) indicated that they increased the quantity and quality of their documentation. Terms such as “now fully document each intervention” and “more thorough in my documentation” were common. One respondent indicated that “documentation is 50% of the job.” There were two comments concerning changes related to *Attentiveness/Surveillance* of the patient. One respondent said she was more attentive, and one reported that she was more observant. Changes in the *Interpretation of Doctors Orders* were reported by one respondent who indicated that the event made her more thorough in reviewing physicians' orders.

No Longer Work in Nursing

Eleven comments indicated that the respondents no longer worked in nursing. Two simply stated that they were no longer working or had left nursing. Two respondents received limited license orders, causing one to retire and one to feel very humiliated because of earning \$5.00 an hour as a receptionist. One person could no longer practice

because she surrendered her license and was unable to find a job in nursing. One nurse reported being unable to work at all for 1.5 years and couldn't pay bills, causing her to file bankruptcy and lose all she owned. Four respondents said that they had changed careers. One of the four became "burned out" and reported working in another field making more money. One said she now works as a security guard making minimum wage, while another reported pursuing a former position of administrative assistant because there is "no situational stress" as there is in nursing. The last respondent who left nursing said she is in school to change careers due to her disenchantment with the profession. Though respondents' comments included some expression of stress or disappointment, there were two comments about leaving the profession that were particularly poignant. One respondent wrote, "Yes I quit nursing. I was told at school and work, nurses eat their own. Nurses do hurt other nurses.... I love the profession of nursing with all of its responsibilities: it is the team and the environment that kills nurses new and old." The last respondent commented, "Yes, I will never again practice nursing; it is simply not worth the emotional stress."

Besides feelings of devastation and loss, the comments of respondents who reported leaving nursing were reviewed to ascertain issues of trust and/or decreased self-reliance. Two respondents commented on a lack of trust, one regarding a general mistrust overall and one advising other nurses not to rely on physicians. There were no comments indicating a better sense of or need for trust in oneself or others. Additionally, none of the respondents who had left nursing indicated a sense of increased self-reliance, suggesting that the respondents who *did* learn how to become more self-reliant stayed in nursing.

Question Two: Based on what you learned from the event, what suggestions would you pass on to help other nurses prevent practice breakdown and/or error events?

Table 18 provides information from 85 responses regarding suggestions the respondents would pass on to other nurses to prevent practice breakdown and/or error events. As with the first question, the responses to question two were initially categorized under the themes found in the modified TERCAP. All of the sections of the modified TERCAP instrument were utilized in developing thematic categories from the responses. When the instrument category did not provide a theme for the response, additional themes were developed.

Suggestions to Nurses Related to System Factors

Table 18 outlines the ten responses related to *System Factors* contained in the modified TERCAP. Five comments related to the theme *Management*, two indicating that nurses shouldn't rely on management for support and another stressing the need for more management support. One comment called for more nurses and ancillary staff, and one nurse cautioned against putting too much faith in support from monitoring equipment. *Orientation/Training* issues were discussed by two respondents, suggesting that nurses should make sure their employers orient them thoroughly. An additional theme under *System Factors* was developed in response to comments by three respondents. *Create Support Groups* was developed because three respondents advocated for support groups to help nurses vent and have open discussions about patient problems without penalties.

Table 18: *Summary of Respondents' Comments to the Question, "Based on What You Learned From the Event, What Suggestions Would You Pass on to Help Other Nurses Prevent Practice Breakdown and/or Error Events?"*

Categories of the modified TERCAP/other themes	Number of comments
Suggestions related to system factors	10
Management	5
Orientation/training	2
Additional theme:	
Create support groups	3
Suggestions relating to health care team members	10
Physicians/nurse practitioners:	
Get support from and get to know	2
Don't trust	2
Staff nurse/co-workers:	
Don't trust	4
Trust	2
Suggestions relating to health care team factors	21
Better communication	6
Greater teamwork	12
Additional theme:	
Trust others	3

Table 18 continued

Categories of the modified TERCAP/other themes	Number of comments
Suggestions relating to individual factors	31
Additional themes:	
Increased self-reliance:	
Trust yourself to do the right thing	10
If you don't feel confident, don't do it	4
Ask for help	4
Know and follow the rules	6
Slow down/be more thorough	7
Suggestions relating to patient factors	1
Suggestions relating to specific types of error	12
Documentation	8
Attentiveness/surveillance	2
Patient advocacy	2
Total number of comments	85

Suggestions to Other Nurses Related to Health Care Team Factors

Table 18 outlines 10 responses related to specific *Team Members* and 21 responses related to *Health Care Team Factors*. Ten of these comments concerned specific members of the health care team. As in question one, where the respondents commented on changes in their practice, the theme of trust in relationships between specific health care workers emerged. Six respondents advised not trusting physicians, nurse practitioners, and other staff nurses. Two of these respondents advised nurses not to count on the physicians or nurse practitioners to back up verbal orders or get too

comfortable in working relationships with physicians. Four respondents suggested not trusting other nurses and coworkers; two warned nurses not to trust each other to watch their patients; and one said not to take the word of another nurse/coworker. One person advised nurses not to rely on ancillary staff when completing assessments. In contrast, four respondents advised nurses to increase their trust of other members of the health care team. These comments advised nurses to get to know physicians and nurse practitioners and encouraged calling the MDs. One respondent described nursing as a job that *must* be “performed with trust with your coworkers.” One respondent also indicated a need to call the hospital supervisor when in a dangerous situation.

There were 21 comments relating to *Health Care Team Factors*. Six of these comments related to the theme of *Better Communication*. Examples of better communication included a comment about good communication between peers in English; a warning that nurses should tell someone if they get into a situation where they cannot care for their patients; a call for open discussions; and advice to go over every order with the nurse giving report. Twelve comments related to the theme *Greater Teamwork*. Within this theme, there were four general statements about building rapport and teamwork. Other respondents suggested getting involved in hospital committees and counting on nursing coworkers to witness medication administration. Three respondents identified issues with shift changes and stressed the importance of working with the oncoming nurses. The most descriptive of the statements about teamwork was from a nurse who stated that it is “better to be surrounded by hundreds of helping hands and minds.”

As provided in comments indicating a global trust or mistrust of others outlined in question one, a theme about trust emerged. However, though there were eight respondents who answered question one by outlining changes in their practice that

reflected a global mistrust of others since the error event, only one respondent answered question two by advising nurses not to trust others. This respondent stated, “Be aware of as many hidden agendas as possible. Keep your friends close and your enemies closer.” There were three comments recommending trusting others to help prevent error events. One of these comments stated that nurses should build an atmosphere of trust and understanding, while another advised to “find somebody you trust.”

Suggestions to Other Nurses Related to Individual Factors

Table 18 outlines 31 comments related to recommendations in *Individual Factors*. None of the individual factors from the modified TERCAP were identified, but five themes were developed to describe comments from the respondents. As in the responses outlined in Question One, *Increased Self-Reliance* emerged as a theme. This theme was developed into two sub-themes: *Trust yourself to do the right thing* and *If you don't feel confident, don't do it*. These two themes had a total of 14 comments, 10 of them relating to the first theme, *Trust yourself to do the right thing*. Three of these 10 were suggestions advising nurses to complete clinical tasks themselves. Two respondents addressed working conditions; one advised nurses to refuse to work in unsafe conditions; and the other stated “If administration is not supportive—get out!” One person suggested taking care of yourself first, while another stated “demand help, demand teaching.” Two respondents wrote about improving their own clinical skills, and one person suggested checking on coworkers even though they might be friends. Two comments advised nurses to voice complaints to supervisors, and two comments related to completely checking out an employer before going to work for them.

Four comments related to the theme *If you don't feel confident, don't do it*. One respondent advised nurses not to take an assignment unless they felt confident with it. One person stated, “Do not let anyone bully you into another course of action,” while

another cautioned against doing something if unsure or feeling badly about a situation. One respondent advised taking safe harbor, a process that provides protection for nurses when they are forced to take an assignment that does not meet BNE requirements.

Another theme was developed from comments suggesting that nurses *Ask for Help*. Of the four respondents, two simply suggested asking for help. Another advised seeking help when not familiar with the signs and symptoms of a disease, and one suggested seeking help when having personal problems. There were seven comments that related to the theme *Slow Down and Be More Thorough*. Two respondents simply said nurses should slow down or don't rush. Another suggested not being pressured by time, while another respondent advised against administering a medication without reviewing the entire chart. One respondent made the statement, "Be on your task at hand," while another stated, "Take your time, do not rush, and follow procedures." There were six comments suggesting that nurses *Know and Follow the Rules*. One respondent suggested that nurses should enforce hospital guidelines and report to JCAHO a hospital that doesn't follow its own policies. Three respondents suggested following nursing policies and rules. One respondent reiterated the need to adhere to professional boundaries. Two respondents stressed the importance of knowing and following the Nursing Practice Act.

Suggestions to Other Nurses Related to Patient Factors

Only one comment related to the theme *Patient Factors*, and it was the same respondent who addressed the theme in Question One. This respondent stated, "Nurses should always be aware of physical threat(s) by an outraged patient. Know that if you find yourself being threatened, [there will be] no one around to assist ... with the patient. You can't run or get away. Protect your face and body and let him beat the hell out of you. For it [is] far better for you to be injured or killed than protecting yourself from the BNE [who] says there is no such thing as self defense in nursing."

Suggestions to Other Nurses Related to Types of Errors

Table 18 outlines 12 comments advising nurses to change their practice to address specific types of errors. Four types of errors were highlighted: *Documentation*, *Attentiveness/Surveillance*, *Interpretation of Doctors' Orders*, and *Patient Advocacy*. As in responses to Question One, the most frequently identified type of error (N = 8) was *Documentation*. Two of the respondents said to document carefully, appropriately, and accordingly. One respondent said to fully document each intervention, while another suggested taking time to document. One simply stated, "Document, document, document." One person suggested that "it is more important to care about documentation than care about patients." One respondent warned to make sure that a DNR (do not resuscitate order) is in the chart, while another respondent advised, "Cover your work with complete charting about incidents, either in the chart or with an incident report."

Three respondents commented on the importance of the *Interpretation of Doctors' Orders*. One wrote that nurses should not assume particular interventions are covered by a physician's orders, while another stressed the importance of completing doctor's orders. One respondent advised nurses not to count on the MD to back up verbal orders and to reverify verbal orders. Though there were no comments on the *Patient Advocacy* theme in Question One, two respondents spoke to it in Question Two as a way to prevent error events. One person suggested that nurses should insist that a physician come see a patient when symptoms warrant it. The last comment addressing patient advocacy stressed starting CPR (cardiopulmonary resuscitation) no matter how long the patient had been left unattended.

SUMMARY

This chapter presented the results of the study's findings. The participant's demographics were described and were found to be representative of the total population of RNs who had been disciplined by the BNE for not meeting standards of nursing practice between December 2004 and December 2006. Through the quantitative component of the modified TERCAP, system and health care team factors were the most frequently selected as contributing to the respondents' error events. Reported patient outcomes indicated that 25% of the error events contributed to serious patient harm or death. There was a significant relationship between patient outcomes and the *Clinical Evaluation* and *Attentiveness/Surveillance* types of errors. Data analysis from 108 comments provided qualitative descriptions of changes nurses made in their practice since the error events and suggestions they would make to other nurses to prevent error events.

Chapter 5: Summary, Conclusions, and Recommendations

This chapter consists of three sections. The first section presents a summary of the study, including the purpose, the research questions, the methodology, and a summation of the findings. The second reviews the findings for each research question, limitations of the findings, and conclusions, and the third section offers recommendations for nursing theory, practice, policy, and research as suggested from the study's findings.

SUMMARY

The purpose of this descriptive, exploratory study was to examine the perceptions of RNs who had been sanctioned by a board of nursing to ascertain categories of practice errors and identify individual, health care team, patient, and system threats that contributed to an error and/or patient harm. The TEMM was utilized as a framework for examining the phenomena that promote or hinder patient safety. Using a modified version of the TERCAP instrument, sanctioned RNs selected types of errors associated with a breakdown in their nursing practice. In addition, they identified factors that contributed to their errors, including individual, health care team, patient, and system factors. Associations between the levels of patient harm and types of error were examined. A nationally developed instrument to collect information about nursing practice errors was modified for the study. Content review through cognitive interviews, pilot testing and test-retest analysis all contributed to an examination of the instrument's reliability and validity.

Five research questions were created to guide data collection for the study. These questions were as follows:

1. What is the demographic profile of RNs sanctioned by the BNE?

2. What are the incidences of individual, health care team, patient, and system threats and types of errors as reported by sanctioned nurses?
3. What are the incidences of the level of harm to the patient as reported by sanctioned nurses?
4. What relationships exist between the types of errors and the level of harm to the patient as reported by sanctioned nurses?
5. What changes in practice do RNs sanctioned by the BNE describe after the error event, and what suggestions do they have for other nurses in preventing error events?

This exploratory study was conducted using a descriptive research design. Variables in the study included the following:

1. Threats – Individual, health care team, patient, and system factors
2. Errors – A breakdown in medication administration, documentation, attentiveness/surveillance, clinical evaluation, prevention, intervention, interpretation of doctors' orders, and patient advocacy
3. Patient Outcomes – Level of harm

Surveys were sent to the entire population of 613 RNs who had received a sanction from the BNE for practice errors between December 2004 and December 2006. Sixty-two RNs responded to the survey. Because this was a descriptive study, data analysis included non-parametric statistics, most of which were frequencies. There was one Spearman's rho correlation conducted to answer research question 4. Prominent themes from the respondents' comments were identified in research question 5.

Even though there was only a 10% response rate, overall, the demographics of the respondents reflected the population of the sanctioned nurses, indicating that the sample was representative of the population. The respondents identified system, health care team,

patient, and individual factors that contributed to their error events. Sixty-five percent of the respondents indicated that their error events did not harm the patient. Ten percent of the error events resulted in harm to the patient, 12% resulted in significant harm to the patient, and 14% resulted in patient death. There was a significant correlation between the level of patient harm and the errors *Clinical Evaluation* and *Attentiveness/Surveillance*. Open-ended questions revealed themes outlined in the modified TERCAP instrument in addition to other themes expressed by the participants.

DISCUSSION OF FINDINGS

The findings for each research question will be discussed. One component of this review was a comparison of this study's findings with other similar research findings. However, the literature pertaining to disciplined nurses is limited. Six studies of disciplined nurses provided some comparative data. It is interesting to note that research regarding nursing errors is becoming more prevalent in the literature, particularly in more recent doctoral dissertations, and will be utilized in this chapter as appropriate.

Research Question 1

Research question 1 asked, "What is the demographic profile of RNs sanctioned by the BNE?" As noted in Chapter 4, the results of this study indicate that the majority of the survey respondents' demographic data were reflective of the demographics of the total population of sanctioned nurses. The largest cohort of respondents reported that they were between the ages of 45 and 54 (38.7%). while an analysis indicated that the mean age was 47 years. Three studies of disciplined nurses in the 1990s reflected a somewhat younger cohort of nurses, with ages ranging from 35 to 40, except for one study that found a mean age of 44 years (Green, 1994; Booth & Carruth, 1998; Earle, 1996). Two studies conducted since 2000 reflect that the nurses involved had a mean age of 44, while

one study reported 49 as the mean age (LaDuke, 2000; Emrich, 2004; Mohar, 2006). Research studies indicate that disciplined nurses are aging. However, all nursing personnel are aging (Health Resources and Services Administration [HRSA], 2000; HRSA, 2003; Buerhaus, Doelan, Ulrich, Norman, & Dittus, 2006), and the aging population of disciplined nurses may well be an artifact of this phenomenon.

The number of years an RN is licensed was also examined. The largest cohort of RNs in this study (20.9%) responded that they had been licensed between 5 and 10 years, with the next largest cohort (17.7%) being licensed between 11 and 15 years. The mean years of licensure was 14 years. Other studies about disciplined nurses indicate similar findings, and most report years of licensure ranging from 6 to 15 years at the time of the event (Green, 1994; Booth & Carruth, 1998; LaDuke, 2000; Emrich, 2004; Mohar, 2006). Only Earle's study (1996) found that the majority of disciplined nurses were within 5 years of licensure. The evidence that seasoned nurses have a greater propensity to make more errors than newly licensed nurses is counterintuitive. It seems logical that nurses with more years of practice would be more competent in their patient care and less likely to make errors resulting in discipline. However, competency may also be related to the number of years that nurses work for an employer. For instance, 76.0% of the nurses in this study reported being licensed for over 5 years, but 76% reported working in their agencies 5 or fewer years. Of these who had been employed for fewer than 5 years, 27.0% reported that they had been in the agency for less than one year. Emrich's study (2004) about disciplined nurses reflected a similar finding in that 80.0% of the nurses had been licensed for over 5 years, while 86.7% had been employed in their organizations for five or fewer years at the time of the error event. In addition, Green (1994) found that nurses were more likely to be disciplined if they had been with an employer for fewer than 3 years. It may be that in addition to competency gained through years of

employment with one employer, years of employment also reflect employer satisfaction and continued support for the nurse. In other words, employers may terminate nurses whom they deem incompetent rather than continue to work with them. Additionally, fewer years of employment also means fewer years to build effective collegial, trusting relationships that may help to mediate errors. A related finding in this study was that 62.9% of the respondents reported being dismissed or asked to resign in lieu of termination after their error events. This high percentage of job separation due to an error event may be more common in the study's population because the Texas Nursing Practice Act directs employers to report nurses to the BNE who have been dismissed for violations of the act (BNE, 2007a). However, such a large percentage was an unexpected finding. Employment tenure and other demographic variables such as age, years of licensure, and educational level and their relationships to nursing error merits further research.

The majority of the study respondents (69.4%) reported working in a hospital setting, in keeping with the findings of other studies concerning disciplined nurses (Green, 1994; Earle, 1996; LaDuke, 2000), except for Emrich (2004), whose study found that the majority worked in a long-term care setting. Hospitals continue to compose the largest sector of employers (59.0%) for the total population of RNs in the United States (HRSA, 2000); therefore, the percentage of disciplined nurses working in hospital settings may reflect this employment demographic.

Another important employment demographic that merits discussion is that 80.6% of the respondents in the study reported working directly with patients. Green's earlier study of disciplined Texas nurses showed similar results in that 71.9% of the participants worked in direct patient care. Findings regarding direct patient care providers' being more involved in patient errors are well documented and not surprising (IOM, 2000,

2004; Spath, 2000; Thomas & Houston, 2005; Benner et al., 2002; Benner et al., 2006). As discussed in Chapter 1, nurses are often the *primary* health care provider in the patient's immediate and ongoing health care. It is the explicit nature of this close relationship (identified as an overt factor) that places the nurse at risk for making health care errors (IOM, 2001, 2004; Reason, 1990, 2000). This study has reviewed a new approach by utilizing the modified TERCAP to gain a better understanding of overt and latent factors, and it is surmised that a more holistic analysis will support nurses who provide direct patient care and are at the highest risk of being involved in an error event. Another example of an approach to examine overt and latent factors has been conducted by the Texas BNE, in conjunction with the Institute for Health Care Excellence at the M.D. Anderson Cancer Center, through the implementation of a pilot project that revamps the evaluation of a nurse's error by conducting an in-depth analysis of system and individual factors (Thomas, Simmons, Graves, & Martin, 2007). Results of this study will also add to the body of knowledge about overt and latent factors as perceived by nurses who are at the most risk for making an error.

The final demographic variable discussed is the educational level of the respondent. A report during the time of the study indicated that the *total* population of all RNs in Texas was composed of 70, 971 (39.0%) ADN-educated nurses and 64,966 (36.0%) BSN-educated nurses. In the population of disciplined nurses within the BNE, 53.8% had an ADN while 31.6% held a BSN, indicating an overrepresentation of ADNs. Likewise, there was an overrepresentation of ADNs (43.5%) in the study's sample when compared with BSN-educated RNs (30.6%). All of the referenced studies on disciplined RNs reflect this overrepresentation of ADNs (Green, 1994; Earle, 1996; Booth & Carruth, 1998; LaDuke, 2000; Emrich, 2004; Mohar, 2006). The literature does not reflect research about the overrepresentation of ADNs in disciplined RNs. However, one

of the first studies to investigate differences in RN education was one by Aiken, Clark, Cheung, Sloane, and Silber (2003). Results of their study indicated that the educational level of RNs in hospitals is related to patient outcomes. They found that surgical patients had lower mortality rates when there were higher proportions of baccalaureate level nurses in the staffing mix. A study of critical thinking skills of Korean nursing students found that although all of the students' average scores were lower than expected, baccalaureate students' scores were significantly higher than the ADN and RN to BSN students (Shin, Jung, Shin, & Soo, 2006). However, in a study evaluating student values concerning professionalism, Martin, Yarbrough, and Alfred (2003) found that overall value orientation scores in graduating nursing students showed that ADN students' scores were significantly higher than those of BSN students on 5 of the 11 subscales in the instrument.

The variance in the ADN population in disciplinary studies may be because they are at the sharp end of the commission of error. More research is needed to understand this variance. As outlined in the BNE's Standards of Practice and Unprofessional Conduct, personal and professional values for nurses are the foundation for safe patient care, and many nurses are disciplined for not meeting these standards. Studies by Aiken et al., (2003); Shin et al. (2006); and Martin et al. (2003) suggest that disciplinary issues with ADN nurses may be more a matter of competency than professional values. Historically, the educational preparation of RNs has been discussed within the context of the nursing shortage and access to education. The relative number of associate degree graduates is growing (HRSA, 2003), and though it is a politically charged issue, reasons for an overrepresentation of ADN-educated nurses in the disciplined population of nurses merits further research.

Research Question 2

Research question 2 asked, “What are the incidences of individual, health care team, patient, and system threats and types of errors as reported by sanctioned nurses?” Most of the factors identified by the respondents as contributions in their error events were *System Factors* (N = 144) and *Health Care Team Factors* (N = 149), as compared with *Patient Factors* (N = 86) and *Individual Factors* (N = 46). In those error events that involved some level of patient harm, *System Factors* (N = 46) and *Health Care Team Factors* (N = 42) also composed the majority of identified factors, while *Patient Factors* (N = 33) and *Individual Factors* (N = 18) ranked lower. As outlined in Chapters 1 and 2, the preponderance of system and team factors contributing to error events identified in this study is supported by other patient safety research findings (IOM, 2001, 2004; Reason, 1990, 2000; Helmreich, 2000a; Helmreich, Wilhelm, Klinec, & Merritt, 2001; Scott, 2004; Sexton, Thomas, & Helmreich, 2000; Thomas, 2000). Recent research on nursing perceptions about error events also supports the influence of system and health care team factors. For example, in a study of factors in a hospital setting that are related to nurses’ frequency of error reporting, Moody (2006) found that 70% of the nurses identified areas of improvement in teamwork, openness of communications, and nonpunitive responses to error. Another study by Hogan (2006) of 326 pediatric nurses’ perceptions of contributions to medication errors in acute care settings found issues with physicians, pharmacy, medication labeling, and systems factors such as staffing and interruptions.

The most often identified *Systems Factors* in this study were those related to staffing (60%) and high work volume/stress (56%). This is an important finding in this research because these factors may reflect nurses’ inability to manage the high numbers and/or complexity of their patients and, as such, may be related to their error events.

Several studies suggest that patient outcomes are related to staffing and workload (Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Aiken et al., 2002; Blegen, Goode, & Reed, 1998; Buerhaus et al., 2006). These types of studies were driven by the national focus on patient safety initiatives discussed in Chapter 1, and additional studies are needed to develop evidence-based solutions to staffing and workload patterns so nurses will have the resources needed to provide safe and effective care.

Individual Factors were the least-often identified factors relating to the respondents' error events. This is an interesting finding because it differs from the qualitative responses to the open-ended questions, which were rich in their descriptions of individual factors. Differences may have been due to the limited number and meaningfulness of items for individual factors on the modified TERCAP. For example, 14 respondents checked "Other" regarding *Individual Factors*, while there were fewer "Other" selections in the *System Factors* and *Health Care Team Factors*. Denial of individual factors may also serve as a form of self-protection, particularly because some of the respondents indicated that the disciplinary process was traumatic. Finally, there may have been fewer items identified in *Individual Factors* because simply checking off a box may not adequately allow a nurse to explain her own limitations in performing patient care.

Of those respondents who did identify an individual factor, fatigue was most often cited as the problem. Nursing and medical studies have provided evidence that fatigue does contribute to patient errors (Rogers, Hwang, Scott, Aiken, & Dinges, 2004; Jagsi et al., 2005; Sexton, Thomas, & Helmreich, 2000). However, in a study of fatigue among sanctioned nurses (N = 117), Thomas (2005) found that 74% denied having feelings of fatigue at the time of their error events. This study contradicts the earlier findings by Thomas (2005) suggesting that fatigue is a factor identified by sanctioned nurses as

contributing to practice-related errors. It should be noted that the differences between the results of the two studies may be due to differences in how the questions were worded or could be due to the different populations that were surveyed (the 2005 study questioned nurses who were being investigated, while this study questioned nurses who had already received a disciplinary sanction).

It may be premature to incorporate evidence-based research on nursing fatigue into regulatory policy. For example, in January 2007, the Texas BNE developed a draft position statement on fatigue based on patient safety research that recommends that nurses work no more than 60 hours a week or three consecutive 12-hour shifts (BNE, 2007b). Before adopting the position statement, the board solicited feedback from stakeholders. Eleven thousand stakeholders responded to the Web site survey, and approximately 200 sent additional e-mails. Ninety-five percent indicated that the BNE should not regulate nursing work hours, and 88% indicated that employers should not regulate nursing work hours (BNE, 2007b). Some of the reasons given for not supporting the position statement were based on issues with the nursing shortage and not interfering with nurses' right to work (BNE, 2007b).

Another interesting finding was that the respondents often mentioned physical health issues even though there wasn't a specific item on the modified TERCAP related to physical health. Physical health issues may be related to the overall aging of the nursing population or it may be related to the physical work involved in direct patient care. The addition of this item to the modified TERCAP may facilitate more information to investigate this finding further.

Types of errors were also examined in this study. Respondents indicated that the majority (63.0%) of errors in the modified TERCAP did not contribute to their error events. However, 36.0% of the errors were reported as either moderately or greatly

contributing to the error event. Of these, *Documentation* (53.8%) and *Medication Administration* (44.2%) were the most frequently selected types of errors that contributed to the respondents' error events. The prominence of these two types of errors could be due to the other error categories' being more nebulous or difficult to define. For instance, it seems that judging whether one made a medication error is much clearer than judging whether one had a breakdown in clinical evaluation and/or prevention. The respondents did choose other categories; however, responses to these other categories were fairly evenly distributed, and they were ranked lower (26.9% to 36.5%) than *Documentation* and *Medication Administration*. The prevalence of these two error categories in this study suggest that health care organizations should examine work processes and quality improvement activities related to documentation and medication administration.

Research Question 3

Research question 3 asks, "What are the incidences of the level of harm as reported by sanctioned nurses?" There were four levels of harm in the patient harm index: no harm, harm, significant harm, and death. In this study, 13% of the nurses reported errors that may have contributed to the patient's death, while 12% reported errors that caused significant patient harm, resulting in 25% of the total reported error events that may have contributed to significant harm or patient death. This percentage is higher than other studies of disciplined nurses. For example, in Emrich's study (2004) of 30 nurses disciplined in Ohio, the author indicated that 90% of the errors did not cause patient harm. Mohar (2006), in a study of 878 RNs disciplined in Washington, reported that there were 22 patient deaths (3%). In a study of 235,159 medication errors, the MEDMARX database outlined that only 0.01 of the errors resulted in a patient's death, while permanent or life-threatening harm occurred in only approximately 0.05 of the reported error cases (Hicks, Santell, et al., 2004). As outlined in Chapter 1, the IOM Report *To*

Errlis Human projected between 44,000 to 98,000 deaths annually due to medical error (IOM, 2000). However, the institute's methodology has been challenged by the Texas Medical Association (Ortolon, 2000). The author claims that the IOM report had serious methodological issues when the researchers extrapolated mortality from data that was "old" and limited to three states. Ortolon also argued that trends in medical errors from sources included in the IOM report have actually decreased from 4.6% in 1977 to 2.9% in 1992, with the numbers for patient deaths showing the most improvement. Such arguments over how to estimate the number of patient deaths resulting from medical error reflect the infancy of patient safety science.

Error rates and subsequent patient outcomes are still not systematically evaluated on a national scale, and methodologies vary state by state (IOM, 2000). This is partially due to not having valid, effective measurement tools (Health Grades, 2006), while some cite lack of funding and political initiatives to drive research and policy development (Zwillich, 2004). Numerous studies have been conducted on medical errors since the initial IOM report, but recent studies of hospitals indicate that progress is slow, results are modest, and there is still a gap in the achievement of the best possible care (Health Grades, 2006).

Why there was such a large percentage of patient death or significant patient harm reported by the respondents in this study is not clear. One factor may be the mandatory reporting laws in Texas that mandate the reporting of serious patient harm, making it likely that nurses sanctioned by the BNE will have more serious patient outcomes than nondisciplined nurses. The other two studies of disciplined nurses' errors and patient outcomes (Emrich, 2004; Mohar, 2006) pertained to the researchers' case reviews within boards of nursing. These studies, however, solicited information directly from the disciplined RNs. One may speculate that RNs involved in an error event that significantly

harmful or contributed to a patient's death felt more compelled to respond to the survey due to personal and professional reasons.

Research Question 4

Research question 4 asks, "What relationships exist between the types of errors and the level of harm to the patient as reported by sanctioned nurses?" A Spearman's rho correlation was conducted between patient outcomes and types of errors. There were significant relationships between the level of patient harm and two types of errors: *Clinical Evaluation* (0.348, $p = 0.05$) and *Attentiveness/Surveillance* (0.308, $p = 0.05$). Though all of the error types could cause patient harm, these two reflect a breakdown in the essence of nursing practice. Benner et al. (2002) describe the methodology in the development of a taxonomy of nursing practice errors in the TERCAP. The category *Clinical Evaluation* was originally named *Inappropriate Judgment*. The article reiterates that nurses pursue solutions to problems through their understanding of the clinical situation. Several types of inappropriate judgments can occur, including inadequate assessment, faulty logic, and a lack of understanding of signs and symptoms. In describing the category *Attentiveness*, Benner et al. (2002) clarify that a breakdown in this component of nursing practice is particularly relevant to patient safety because nurses' attention to patients can identify potential hazards or errors in treatment. Attentiveness or lack thereof can lead to a phenomenon called failure to rescue when nurses do not intervene and initiate activities for the patients when their clinical condition merits intervention (Benner et al., 2006). This study's findings of significant relationships between *Clinical Evaluation* and *Attentiveness/Surveillance* and the level of patient harm suggest that these error types are worthy of further investigation and research.

As with prior studies, this study found that the majority of errors did not harm the patient. This finding is supported by other research (IOM, 2000; Hicks, Santell, et al.,

2004) and is not surprising. What is surprising is that of the errors that did cause harm, there were more reported errors that caused significant harm or death than errors that caused only minor harm. It may be that for the RNs who were involved in an error event that caused serious patient harm or death, the impact of the event was such that they had better recall than those RNs whose errors resulted in minor harm. Or it may be that these RNs felt more compelled to respond to research regarding patient safety. The IOM suggested investigating nursing error and patient harm (IOM, 2004), and this research study is a response to that call.

Research Question 5

5. Research question 5 asks, “What changes in practice do RNs sanctioned by the BNE describe after the error event, and what suggestions do they have for other nurses in preventing error events?”

Responses to Research Question Five were solicited through two open-ended questions. The first asked, “Did this event change your nursing practice, and if so, how?” and the second question asked, “Based on what you have learned from the event, what suggestions would you pass on to help other nurses prevent practice breakdown and/or error events?” Fifty-five (88%) of the respondents commented on the first question and 53 (85%) on the second, and they gave 170 comments, providing the opportunity to develop common themes. Comments were initially analyzed by utilizing the modified TERCAP template to develop themes. Responses fit within all of the modified TERCAP headings except that no one responded to *System Factors* when discussing changes in their own practice. However, there were 10 comments regarding *System Factors* in suggestions to other nurses. It is interesting to note that respondents gave other nurses suggestions about addressing system factors but did not address this in their own practice. Perhaps they view their own practice more introspectively and within the context of their

own strengths and limitations, whereas they may think more expansively when advising other nurses.

In addition to the themes within the modified TERCAP, other themes emerged. For example, the word *trust* was very prevalent in the comments, and several themes about trust emerged. In response to the question about changes in their practice, several respondents described a lack of trust about themselves and team members as well as global mistrust of other staff and the profession in general. Many of the statements were emotional in nature and indicated that the nurses were treated as outsiders and were often unsure of themselves, making them more cautious in their practice. Other emotive statements were made by some of the respondents regarding conflict within the team. Similar findings were noted by LaDuke (2000), Booth and Carruth (1998), and Green (1994), who reported participants' feelings of lack of trust as well as a sense of shame and anger.

Of interest is that there were just as many comments about changes in practice that led to the respondents' having *more* trust since the error event. Themes emerging from these comments indicate that respondents had experienced a change since the error event and were now empowered to take charge of their practice. For example, the theme *Increased Self-Reliance*, reflecting the sub-themes *I trust myself to do the right thing* and *If I don't feel confident I don't do it*, were made. This sense of empowerment was also reflected by respondents whose comments formed the themes *Increased My Education*, *Slowed Down and Reduced Stress*, *Know and Follow the Rules*, and *Humbled/ Know I Can't Handle It All*, all of which indicate that the respondents identified changes that were needed in their practice. LaDuke (2000) Booth and Carruth (1998), and Green (1994) also reported similar findings of empowerment. For instance, Green found that

many nurses were optimistic about their future, while Booth and Carruth found that being disciplined ultimately proved to be a positive experience for the nurses.

One might speculate that nurses who were terminated or asked to resign by their employers due to the error events might feel less confident in their abilities. Conversely, however, of the 11 respondents whose comments reflected increased self-reliance, all but one reported that they were either terminated or asked to resign. Of the 9 RNs whose comments reflected a reduced sense of self-confidence, over half (5) were not terminated or asked to resign. These findings suggest that termination following an error event may not, over the long term, negatively affect the nurses' self-confidence. However, it was not known how much time had passed from the respondents' experience of dismissal to the time they received the survey, and the passage of time may have changed their perceptions. In addition, the consequences of the sanction may have caused them to reframe the situation and learn from the event. This finding may also be due to sample bias in that those who experienced increased self-reliance, whether or not they were terminated from their employment, were more apt to respond.

Another finding is that when responding to items in the modified TERCAP, the participants identified system and health care team factors three times as often as individual factors. Yet, when respondents were given the opportunity to discuss the error event in response to open-ended question regarding changes in their practice, their comments were prolific and multifaceted. As previously discussed, this may be due to the limited number of items for individual factors in the modified TERCAP. However, by providing a mechanism to allow discussion of individual factors in their own words, it may be that the respondents were able to provide a more reflective, comprehensive self-analysis.

Though several respondents indicated that they had issues with trust and conflict, only four respondents wrote comments indicating that they had no part in the error event and that it was someone else's fault. Booth and Carruth (1998) found that nurses who denied any fault had less insight about the incident and, if given another chance, may not know how to avoid the mistake. Though it is possible that a nurse might be set up to "take the fall," as one respondent put it, very few nurses suggested they were blameless.

Eleven RNs (18%) indicated that they had left the nursing profession. Many of their comments suggested that the events devastated them personally as well as professionally. Bankruptcy, low-paying jobs, and emotional sequela were some of their reported outcomes. LaDuke's (2000) study had similar findings describing nurses' losses of jobs, homes, friends, and financial stability after discipline by a board of nursing. Understandably, there were no comments related to increased self-reliance from these nurses. However, four of these RNs did suggest that other nurses use self-protective measures. An analysis of the findings also reflected that 8 of the 11 RNs who left nursing were terminated or asked to resign in lieu of termination, suggesting that the error events ended their careers in nursing.

LIMITATIONS OF THE FINDINGS

This study was limited to RNs licensed in Texas and sanctioned by the Texas BNE; consequently, the results cannot be generalized to the population of sanctioned RNs in the United States. The low response rate also could have contributed to a non-representative sample. Because these RNs had been sanctioned by the BNE, they may have experienced shame, anger, and embarrassment, leading to responses that may not have been objective or accurate and that may have been self serving (Streiner & Norman, 2004). The sample was selected from a database of nurses who had been disciplined between December 2004 and December 2006. Responses from the RNs disciplined in

late 2004 or early 2005 may have been quite different from those of RNs who had been more recently disciplined. For example, the adage that “time heals all wounds” may have influenced those respondents with earlier sanctions to be more reflective and accepting than nurses with a more recent discipline experience. The difference in the number of years that had passed since the sanction by the BNE may also have perpetuated recall bias.

CONCLUSIONS

The findings of this study indicate that the TEMM may provide a conceptual model for the evaluation of threats to patient safety through the identification of individual, health care team, patient, and system factors that contribute to nursing error. Because the TERCAP was originally developed for investigators at boards of nursing, the instrument was modified for this study. Some of the RNs who reviewed the instrument for modifications voiced concerns about negative wording such as *practice breakdown* instead of *error event*. This review process highlighted the impact of language on potential participants, and subsequent changes were made by the researcher before the study was conducted to modify the instrument in order to incorporate concepts within the TERCAP but also to ensure that the items would not offend and would solicit a response.

Respondents selected individual, health care team, patient, and system factors that contributed to their error events. *System and Health Care Team Factors* were the most common items selected as contributing to the error events, while *Individual Factors* were the least often selected items. However, given the opportunity to discuss individual factors through open-ended questions, responses were comprehensive. It is likely that these reflections were facilitated by allowing the respondents to use their own words in describing individual factors contributing to the error events. Subsequently, the value of using the items in the *Individual Factors* section of the modified TERCAP to capture

perceptions of RNs about their individual contributions to the error events is limited. Regarding patient factors that contributed to the error event; among the most commonly selected factors were those that affected communication between the RN and the patient. This finding could play a role in the development of methodologies for patient acuity systems that could allow more nursing time for patients who have difficulty communicating with their caretakers.

The most common types of errors identified by respondents were related to documentation and medication errors. The respondents indicated that the majority of the errors did not cause patient harm; however, the reported incidences of patient death and significant harm were higher than expected. There were also significant relationships between the level of patient harm and the errors *Clinical Evaluation* and *Attentiveness/Surveillance*, indicating that breakdowns in these two aspects of nursing practice were related to patient outcomes.

Using their own words to describe changes in their practice since the error events, respondents' comments were comprehensive and emotive, particularly around issues of trust. Many of the respondents wrote about how they trusted themselves more since the error event to make the necessary changes to practice safely. Other comments reflected a lack of trust in themselves and others. Several left the profession because of the error event and sanction by the board. These responses indicate that although many of the respondents understood their contributions to the errors, being involved in an error event and subsequent sanction by a board of nursing is an emotionally charged experience and that those emotions should be anticipated by boards of nursing, employers of nurses, and nurses themselves.

Respondents also described how they would change their practice regarding specific types of errors, most frequently describing improvements in documentation. The

frequency of comments about documentation and the corresponding frequency of error related to documentation in the modified TERCAP suggest that this is an important issue for sanctioned nurses. This may partially be a result of the investigation process by the BNE, where documentation serves as evidence in evaluating a nurse's response to reported allegations of unsafe practice.

The finding that the majority of the respondents were able to discuss specific changes in their practice is important. Positive or negative, these comments can provide direction for further study on board remediation processes. All of the findings of the study provide the perspectives of sanctioned RNs who have been intimately involved in an error event. This perspective has provided multidimensional findings to support the development of new, evidence-based approaches to patient safety.

RECOMMENDATIONS FOR NURSING THEORY

The simplicity of the constructs within the TEMM as presented in Appendix A was very beneficial in providing a heuristic framework for examining the variables of interest. However, the more detailed representation of the model in Appendix B was not as helpful in guiding the study for two reasons. First, the concepts outlined in constructs were not supported by the patient literature reviewed for this study; and second, the framework provided by the TERCAP instrument (developed by and for nurses) provided a better conceptual approach for guiding data analysis. For example, the taxonomy of error in the TERCAP was specifically developed for nursing practice errors and was much more pertinent to this study than the taxonomy outlined in the TEMM. For future theoretical development, the constructs of the TEMM could be utilized as a template for further model development, which could utilize concepts found within the TERCAP. Due to the sensitivity of the language in the instrument, this study posed *factors* rather than *threats* that contributed to error events. Future research could explore the nuances

between these concepts and whether sanctioned nurses viewed these *factors* as *threats*. Findings from this study about the contributions to error events could provide a foundation for future research into the management strategies and countermeasures identified in the TEMM. These strategies could be explored specifically for nursing personnel or for all of the health care team, such as was done in the work that has been conducted by Eric Thomas and colleagues (Thomas, 2000).

Modifications to the instrument for this study may contribute to beneficial revisions for the TERCAP. For instance, because physical health was frequently identified in the “other” section of *Individual Factors*, this may be an important item to include. In addition, adding open ended questions also may provide a much more comprehensive analysis of remediation strategies.

Further research is needed to investigate how to integrate a multifactored approach to error evaluation. Historically, individual contributions to error events have been readily analyzed, and evidence for the inclusion of system, patient, and health care team factors may be needed for health care organizations to adopt this model. Because of the complexity of the construct of system factors, more research is needed to develop concepts that promote a comprehensive and systematic analysis of system variables.

RECOMMENDATIONS FOR NURSING POLICY

The mission of all health professional regulatory boards is to license and monitor health care professionals’ practice for the purposes of patient safety. Because these boards’ purview is over the licensee, they are very familiar with reviewing individual factors involved in error events. Patient safety research, including this study, shows that organizational attributes may also contribute to patient errors, and boards of nursing are responding by modifying and developing new methodologies for investigations. An evidence-based model designed to investigate the multidimensional aspects of error

events would promote a more comprehensive, global review for methods that promote patient safety. Because nursing regulatory boards have no purview over systems, health care teams, or patients, the challenge will be in developing political and legal structures to allow regulatory bodies to explore all of these factors. The BNE's Patient Safety Pilot is an example of such a structure.

This study found that if given an opportunity to describe changes that were needed in their practice, RNs will do so. As regulatory boards develop remediation strategies for nurses involved in practice error events, it may be pertinent to also obtain the nurses' input on what strategies they think will help them become more competent practitioners. This study also found that being involved in an error event and sanctioned by a board of nursing is likely to result in nurses' either overcoming the experience and becoming more self-reliant in their practice or being devastated by the event and losing self-confidence and trust. Gaining a better understanding of the factors that promote self-reliance would greatly assist in remediation strategies. If it is clear that an RN's practice should be terminated, it is suggested that regulatory bodies develop anticipatory strategies to facilitate avenues for dealing with this traumatic event. Ensuring that nurses understand the laws and regulations that guide their practice is essential. One way this is being accomplished in Texas is through a mandate from the legislature that requires the BNE to implement a nursing jurisprudence exam for new graduates of nursing programs. Lastly, regulatory boards should develop information systems such as the TERCAP to provide meaningful information in order to educate nurses and the public in order to understand and prevent error events.

RECOMMENDATIONS FOR NURSING PRACTICE

Nursing administrators and peer review committees should review all of the factors involved in an error event. The challenge will be in educating stakeholders about

the multidimensional aspect of error events. In JCAHO-credentialed hospitals, this review is usually conducted within a root cause analysis. However, this information is privileged, and many institutions will not share findings with boards of nursing. If boards of nursing are going to evaluate the multiple factors involved in a nurse's error, they must have access to this institutional information. Research findings about nurses and issues with staffing and high work volumes are not new and will probably not surprise nursing administrators. However, this study shows that issues with staffing and high work volumes were the most frequently identified system contributions to nursing errors. The importance of administrators' implementing staffing and workload patterns that promote safe, effective nursing care for their patients cannot be overstated. When investigating workload patterns, a priority should be the development of documentation processes that capture essential patient care information. The good news is that technological advances are becoming more apparent in the patient safety literature, and all members of the health care team should benefit from these developments.

Though it may be a challenge because of competing priorities, nursing educators should ensure that the nursing curricula contain information about the etiology and management of nursing errors. Graduates should enter the nursing profession with an understanding that being a "perfect" nurse will not necessarily ensure patient safety, and they should be equipped with evidence-based strategies to identify and mediate the factors involved in error events.

Nurses in practice should have knowledge of human factors science so they understand the etiology of error events. Utilizing a model that investigates individual as well as other factors that contribute to errors may help promote morale and a sense of fairness in nursing staff. Understanding the multidimensional nature of error events should promote the nurse's ability to identify all of the factors and implement mediating

strategies. Being able to understand, address, and change system factors will be the primary challenge for many staff nurses. This is why the involvement of the health care facility's leadership is critical to the success of systems that promote patient safety. Nurses on the front line often understand the hidden issues that need to be addressed for safer systems; the question will be whether the organization's leadership can implement fair, equitable, and fiscally responsive solutions.

It is imperative that nurses understand the laws and regulations that govern their practice, the most important being their duty to the patient. They should not depend on their employers to interpret these regulations or believe that facility policy is always in the best interest of the patient. Nurses should take note from their colleagues in this study who indicated that they had learned to trust themselves to do the right thing and did not do something they were not confident in doing. At the same time, nurses should also learn how to work with their employers to implement cost-effective, quality-based solutions to the problems they encounter in their practice.

RECOMMENDATIONS FOR NURSING RESEARCH

The demographics of sanctioned RNs in this and other studies suggest that these nurses have been licensed for several years and are aging along with the entire RN population in the United States. Research should be conducted to ascertain whether there are any individual factors related to aging that may contribute to error events. This study and other studies regarding disciplined nurses suggest there is an overrepresentation of ADN-educated nurses. It is possible that ADN-educated RNs may be more likely to be in direct patient care positions, which would place them at higher risk for making a practice error and being reported to a board of nursing. Further research should explore and evaluate the reasons that ADNs are more prevalent in the disciplined RN population. This study found positive correlations between reported breakdowns in two types of nursing

practice, *Clinical Evaluation* and *Attentiveness/Surveillance*, and the level of patient harm. Further research is needed to evaluate whether or not these relationships are causal.

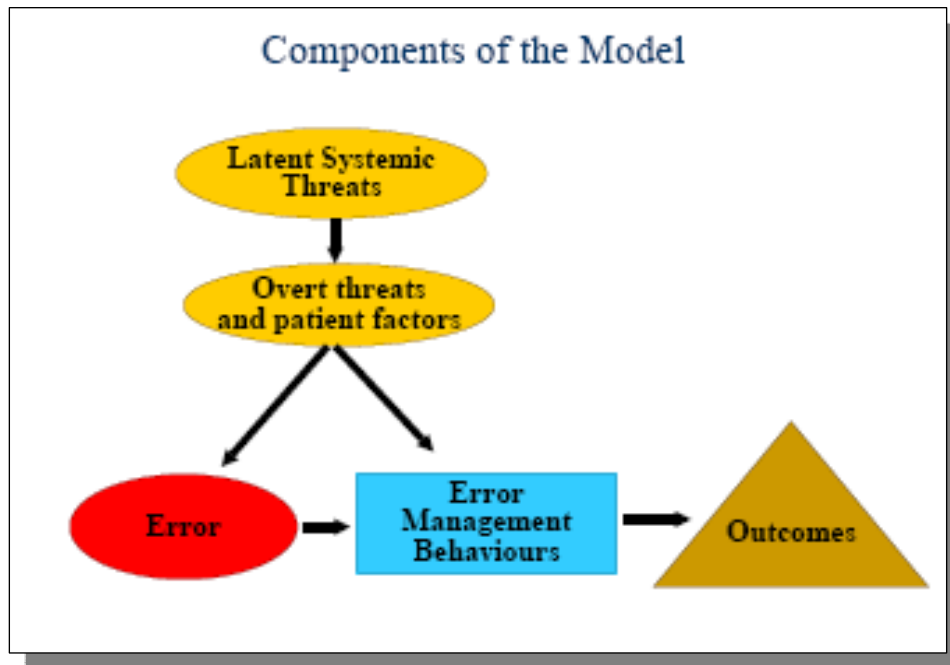
Other areas for research include implementing a systems approach to testing interventions that improve communication, build trust and enhance team functioning and if these improvements relate to the commission of health care errors. Additionally, further research about relationships between patient outcomes such as morbidity and mortality and the multiple factors identified in this study could provide new knowledge for the development of patient safety programs.

CONCLUSION SUMMARY

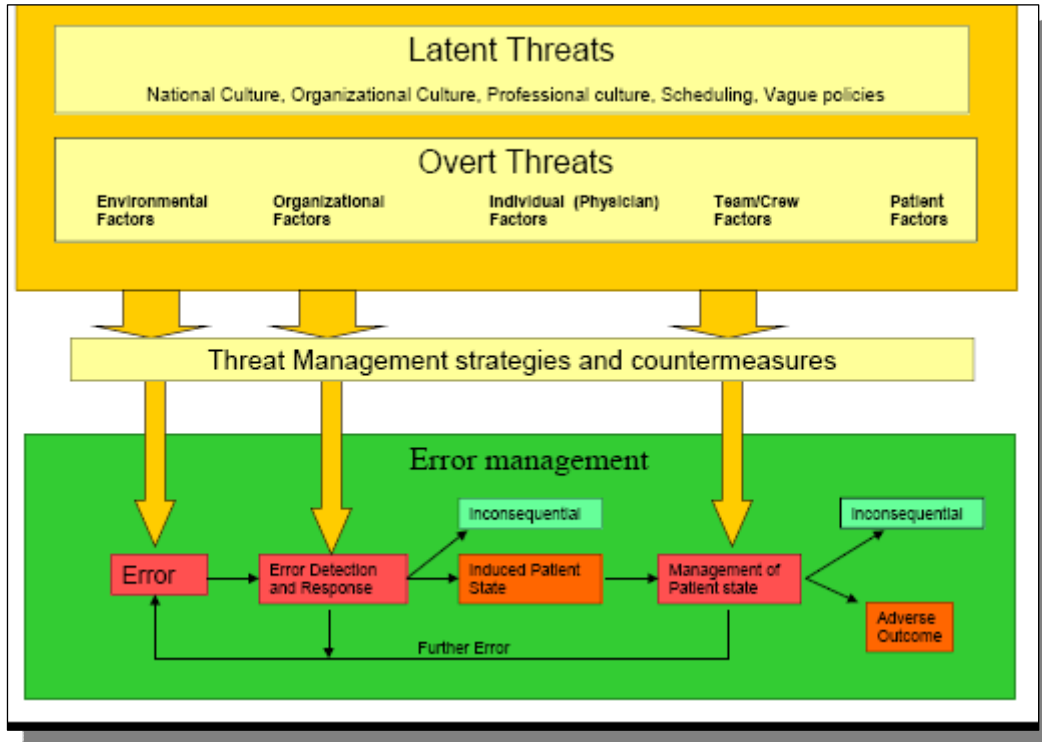
This chapter provides a summary of the purpose, research questions, methodology, and findings. The findings for each research question were reviewed along with limitations of the findings and conclusions. Finally, recommendations for nursing theory, practice, policy, and research were made and could provide future directions for the nursing profession.

Appendices

APPENDIX A: CONSTRUCTS WITHIN THE THREAT AND ERROR MANAGEMENT MODEL



APPENDIX B: THE THREAT AND ERROR MANAGEMENT MODEL



APPENDIX C: MODIFIED TERCAP INSTRUMENT

Survey – Please Return by February 10, 2007

Nursing Error Events System, Team, Patient, and Individual Factors

Research in patient safety is providing evidence that multiple factors lead to health care errors. These may include system, health care team, patient, and individual factors. Any of these factors can contribute to practice breakdown or error events. This survey is being sent to several hundred RNs who have had an experience with an error event that led to an agreed order by the Texas Board of Nurse Examiners (BNE). We are seeking your viewpoint about all of these factors to gain your perspective about the event. There is no identifying information; the survey is completely anonymous and does not pertain to your previous order by the BNE. The University of Texas Institution Review Board also ensures that the researcher protects the participant in the assurance of anonymity.

I. Demographic Information

This information, although anonymous, will help us gain an understanding about the nurses who complete this survey. Please provide your information in this section.

Your age at the time of the event _____ years

At the time of the event, how many years had you been licensed as an RN? _____ years

Please indicate the highest educational level you had achieved at the time of the event.

- | | |
|---|---|
| <input type="checkbox"/> LVN to ADN/BSN Program | <input type="checkbox"/> Diploma in Nursing |
| <input type="checkbox"/> Associate Degree in Nursing | <input type="checkbox"/> Other; please specify: _____ |
| <input type="checkbox"/> Baccalaureate Degree in Nursing | |
| <input type="checkbox"/> Associate Degree to Baccalaureate Degree | |

Did you receive your pre-licensure education in the U.S.?

- ☐ Yes ☐ No

II. Employment Setting

This information concerns your employment at the time of the event. Please check the appropriate answer.

1. Type of facility or environment at the time of the event

- | | |
|---|---|
| <input type="checkbox"/> Ambulatory care | <input type="checkbox"/> Home care |
| <input type="checkbox"/> Assisted living | <input type="checkbox"/> Hospitals |
| <input type="checkbox"/> Behavioral health | <input type="checkbox"/> Long-term care |
| <input type="checkbox"/> Office-based surgery | <input type="checkbox"/> Other; please specify: _____ |
| <input type="checkbox"/> Physician's office | |

2. Length of time you had worked for the organization/agency at the time of the error event

- ☐ Less than 1 year ☐ 1 – 5 years ☐ More than 5 years

3. Length of time you had worked in the patient care location/unit/department at the time of the error event

- ☐ Less than 1 year ☐ 1 – 5 years ☐ More than 5 years

4. Length of time you had been in the nursing position/role at the time of the error event

- ☐ Less than 1 year ☐ 1 – 5 years ☐ More than 5 years

5. Your assignment at the time of the error event

- | | |
|--|--|
| <input type="checkbox"/> Direct patient care | <input type="checkbox"/> Nurse manager/supervisor |
| <input type="checkbox"/> Team leader | <input type="checkbox"/> Combination patient care/manager role |
| <input type="checkbox"/> Charge nurse | <input type="checkbox"/> Other |

Were you working in a temporary capacity (e.g., traveler, agency, float, covering for another nurse)?

- ☐ Yes ☐ No

6. Employment outcome after the error event

- | | |
|--|---|
| <input type="checkbox"/> Stayed with my employer | <input type="checkbox"/> Dismissed from employment |
| <input type="checkbox"/> I resigned | <input type="checkbox"/> Other; please specify: _____ |
| <input type="checkbox"/> I resigned in lieu of termination | |

Thank you for your participation.

Page 1

III. Assessment of System Factors

System factors are those conditions in your workplace setting that are not easy to identify but may predispose situations leading to errors.

Please check **all** system factors that related to the error event that led to an agreed order with the BNE:

- ☐ **Communication system factors** such as failures in technology, computer systems, patient identification
- ☐ **Environmental factors** such as frequent disruptions, lack of adequate supplies/equipment, malfunctioning equipment, poor lighting
- ☐ **Management factors** such as inadequate patient acuity systems, inadequate/outdated policies and procedures, inability to find policies/procedures, unsure who is in charge, questionable directions from nurse manager/administration
- ☐ **Backup and support factors** such as lack of physician response, lack of lab/X-ray/pharmacy response, lack of housekeeping, lack of security
- ☐ **Staffing factors** such as sustained nursing shortage, lack of experienced nurses, inadequate staffing levels, ongoing use of agency nurses, excessive staff nurse floating, mandatory overtime
- ☐ **Not applicable**
- ☐ **Other**; please specify: _____

IV. Assessment of Health Care Team Factors

Health care team factors include actions by those individuals with whom you share practice responsibilities.

Did other members of the health care team contribute to the error event? If so, please check **all** that apply.

- | | |
|--|---|
| <input type="checkbox"/> Supervisory nurse/personnel | <input type="checkbox"/> Medication aide, nurse aide, or other unlicensed personnel |
| <input type="checkbox"/> Physician, other prescribing provider | <input type="checkbox"/> Other health professional (e.g., PT, OT, RT) |
| <input type="checkbox"/> Pharmacist | <input type="checkbox"/> Other support staff, patient, patient's family/friends |
| <input type="checkbox"/> Staff nurse | <input type="checkbox"/> Other; please specify: _____ |
| <input type="checkbox"/> Floating or temporary staff | |
| <input type="checkbox"/> Health profession student | |

Please check **all** items related to the health care team that contributed to the error event that led to an agreed order with the BNE:

- ☐ **Communication factors** such as inadequate time for shift change, inadequate communication with physicians and/or peers, illegible handwriting, inadequate chain of command for resolving conflict
- ☐ **Lack of teamwork** such as other nurses not doing their share, physicians not seeking nursing input, issues with ancillary departments
- ☐ **Inadequate patient support** such as lack of patient education materials, lack of equipment to monitor and maintain patient safety
- ☐ **Unwritten unit customs** such as not notifying physicians at night, administering medications in a manner not approved in policy/procedure, departure from documentation guidelines (e.g., pre-charting)
- ☐ **Not applicable**
- ☐ **Other**; please specify _____

V. Patient Profile

This information concerns the patient who was involved in the error event. Patient factors include characteristics exhibited by the patient that may have contributed to the event. **If more than one patient was involved, please provide information on the patient you most readily recall.**

Please indicate the patient's age:

- ☐ Infant (0 – 1 year) ☐ Child (2 – 12) ☐ Adolescent (13 – 21) ☐ Adult (22 – 64) ☐ Elderly (65 and older)

Characteristics you observed the patient exhibiting that may have contributed to the event:

(Check **all** that apply)

- | | |
|--|--|
| <input type="checkbox"/> Agitation/combativeness | <input type="checkbox"/> Inadequate coping/stress management |
| <input type="checkbox"/> Altered level of consciousness | <input type="checkbox"/> Incontinence |
| <input type="checkbox"/> Cognitive impairment | <input type="checkbox"/> Insomnia |
| <input type="checkbox"/> Communication/language difficulty | <input type="checkbox"/> Sensory deficits (hearing, vision, touch) |
| <input type="checkbox"/> Depression | <input type="checkbox"/> Other; please specify: _____ |

Thank you for your participation.

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VI. Patient Outcome

What happened to the patient as a result of the error event? Please select only **one** response.

- | | | |
|--------------------------|------------------|--|
| <input type="checkbox"/> | No Harm | An event occurred with no harm to the patient. |
| <input type="checkbox"/> | Harm | An event occurred that caused a minor negative change in the patient's condition. |
| <input type="checkbox"/> | Significant Harm | An event occurred that caused significant harm to the patient. Significant harm involves serious physical or psychological injury. |
| <input type="checkbox"/> | Patient Death | An event occurred that may have contributed to the patient's death. |

VII. Eight Standards of Practice

The following eight standards are categories of practice related to safe nursing care. Issues in maintaining these standards may lead to errors. Please check the following categories that contributed to the error event that led to an agreed order with the BNE.

Options range from "did not contribute" to "greatly contributed" to the event.

Please check one response for each question.

1. Medication Administration

The six rights of medication administration are used by nurses as a safety check before medicines are administered. The nurse administers the right dose of the right medication via the right route to the right patient at the right time for the right reason.

To what extent do you feel an issue with medication administration contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

2. Documentation

Nursing documentation provides relevant information about the patient and what was done in response to their needs. Accurate record keeping and careful, timely documentation are essential parts of nursing practice that promote safe patient care.

To what extent do you feel an issue with the documentation process contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

3. Attentiveness/Surveillance

Nurses monitor what is happening with patients. Nurses observe the patient's clinical condition; if the nurse has not observed the patient, then she/he can not identify changes if they occurred and/or make knowledgeable decisions about the patient.

To what extent do you feel an issue with attentiveness or surveillance contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

4. Clinical Evaluation

Nurses interpret patients' signs, symptoms, and responses to therapies. Nurses evaluate the relevance of changes in patient signs and symptoms and ensure that patient care providers are notified and that patient care is adjusted appropriately.

To what extent do you feel an issue with clinical evaluation contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

5. Prevention

Nurses follow usual and customary measures to prevent risks, hazards, or complications due to illness or hospitalization. These include fall precautions, preventing hazards of immobility such as contractures, stasis pneumonia, etc.

To what extent do you feel an issue with prevention contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

6. Intervention

Nurses execute nursing healthcare procedures aimed at specific therapeutic goals. Interventions are implemented in a timely manner. Nurses perform the right intervention on the right patient.

To what extent do you feel an issue with providing an intervention contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

7. Interpretation of Doctors' Orders

Nurses work with authorized providers to ensure appropriate patient care. Providers' orders/standards/protocols should be clear and well written. Nurses intervene if they believe a provider's order is in error or ambiguous. Nurses verify telephone/verbal orders. Nurses do not provide medical interventions without an authorized provider's order.

To what extent do you feel an issue with interpreting an order contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

8. Patient Advocacy

Nurses advocate for the patient so that their needs/concerns are addressed. Because patients/families are often vulnerable, nurses have a duty to protect them.

To what extent do you feel an issue with patient advocacy contributed to the event?

- | | | | | | |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|
| <input type="checkbox"/> | Did not contribute | <input type="checkbox"/> | Moderately contributed | <input type="checkbox"/> | Greatly contributed |
|--------------------------|--------------------|--------------------------|------------------------|--------------------------|---------------------|

Thank you for your participation.

Page 3

VIII. Individual Nursing Factors that You Think Contributed to the Event

Factors that you might have experienced during the time of the error event that led to an agreed order with the BNE. Check **all** that apply.

- | | |
|---|---|
| <input type="checkbox"/> Inexperience (with clinical event, procedure, treatment, or patient condition) | <input type="checkbox"/> Fatigue/lack of sleep |
| <input type="checkbox"/> Language barriers | <input type="checkbox"/> Mental health issues |
| <input type="checkbox"/> Drug/alcohol impairment/substance abuse | <input type="checkbox"/> Other, please specify: _____ |

IX. Other System and Team Factors that You Think Contributed to the Event

Additional factors found within the system or health care team that may have contributed to the error event. Check **all** that apply.

- | | |
|---|---|
| <input type="checkbox"/> No rest breaks/meal breaks | <input type="checkbox"/> Overwhelming assignment |
| <input type="checkbox"/> Lack of orientation/training | <input type="checkbox"/> Lack of team support |
| <input type="checkbox"/> High work volume/stress | <input type="checkbox"/> Other, please specify: _____ |
| <input type="checkbox"/> Conflict with team members | |

X. In Your Own Words

In addition to the above survey, we would like you to respond to the following questions in your own words. Please print in the space below or attach a typed response.

1. Did this event change your nursing practice and, if so, how?

2. Based on what you have learned from the event, what suggestions would you pass on to help other nurses prevent practice breakdown and/or error events?

Thank you for your participation.

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APPENDIX D: COVER LETTER TO PARTICIPANTS

IRB APPROVAL: 01/18/2007

APPROVAL EXPIRES: 01/17/2008

Dear Nursing Colleague,

I am requesting your assistance in a study that is designed to identify factors that affect patient safety. Research is beginning to show that there are many factors which contribute to error events that occur while delivering health care to patients. These factors may be related to health care systems, health care teams, patients and individual practitioners. I am a doctoral student and employee of the Board of Nurse Examiners (BNE) and for my dissertation I have selected over 600 RNs from the BNE data base containing practice-related agreed orders. Every RN is being sent the survey to gain his/her perspective about all of the factors in the error event that led to an agreed order with the BNE.

As one of several hundred registered nurses asked to participate in the study, your perspective will provide valuable information in helping nurses, the nursing profession and boards of nursing to identify many of the factors involved in practice related error events. Although practice errors are being studied by many groups, few of them are seeking the perspective of nurses who have directly been involved in these events. By completing the attached survey, your input will make a difference.

Please note that this study has no identifying information. It is completely voluntary and any information that is shared on the survey is for research purposes only. Data collected through the surveys is not identifiable and individual survey information will not be given to the BNE. Your rights to informed consent, privacy and confidentiality are thoroughly reviewed on the attached page.

Please consider taking this opportunity to provide your input. The survey should take no longer than 20 – 25 minutes of your time to complete and your perspective will contribute to a better understanding of the multiple aspects of error events.

Please return the surveys by February 10, 2007.

Thank you very much for your time.

Sincerely,

Mary Beth Thomas, RN

University of Texas at Austin Research Study – Informed Consent to Participate in Research
Perceptions of RNs – Individual, Healthcare Team, Patient and Individual Contributions to Error
Mary Beth Thomas, RN 512-638-3573
Susan Houston, RN 512-471-9462

IRB APPROVAL: 01/18/2007

APPROVAL EXPIRES: 01/17/2008

University of Texas at Austin Research Study
Internal Review Board Case Study 2006-10-0001

The survey is voluntary and you are under no obligation to respond. Completion of the survey implies consent to participate. If you do not wish to participate, do not respond to the survey. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. Your refusal will not impact current or future relationships with UT Austin or the BNE. If you would like to complete and return the survey, the information is completely anonymous and does not contain any identifying information. Any information that you share with me is for research purposes only. Aggregated data resulting from the study may be made available to other researchers in the future for research purposes not detailed in this letter. In these cases, data will contain no identifying information that could associate you with it or your participation in the study. The records of this study will be stored securely and kept confidential. Once the study is finished, all surveys will be destroyed. Only authorized persons from The University of Texas at Austin and members of the Institutional Review Board have the legal right to review your survey and will protect the **confidentiality** of this survey. All publications will exclude any information that will make it possible to identify you as a participant.

The benefit of being in the study is that you will provide boards of nursing with a better understanding of the multiple factors involved in nursing practice errors. The ultimate goal of the study is to enhance patient safety and prevent further practice errors.

There are no known risks in this study and though unlikely there may be some risks that are currently unforeseeable. If you wish to discuss the information above or any other risks you may experience, you may call me with any questions.

If you would like to participate in the study simply complete the enclosed survey and return it in the enclosed stamped envelope. The survey should take between 20-25 minutes to complete.

If you have any questions about the study, please contact me at mbttex@aol.com or 512-638-3573. If you have questions later, want additional information, please contact me. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Lisa Leiden, Ph.D., Chair of The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, (512) 471-8871 or email: orssc@uts.cc.utexas.edu.

Thank you very much for your time.

Mary Beth Thomas, RN

APPENDIX E: IRB APPROVAL FOR PILOT OF THE MODIFIED TERCAP INSTRUMENT



OFFICE OF RESEARCH SUPPORT & COMPLIANCE

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 (512) 471-8871 - FAX (512) 471-8873
North Office Building A, Suite 5.200 (Mail code A3200)

FWA# 2030

Date: **09/12/06**

PI(s): Mary E Thomas

Department & Mail Code: NURSING SCHOOL

D0100

Dear: Mary E Thomas

IRB APPROVAL – IRB Protocol # **2006-03-0085**

Title:

**Modification and Testing of the Taxonomy of Error Root Cause
Analysis of Practice - Responsibility (TERCAP) Instrument.**

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board has reviewed the exempt status assessment of the above referenced protocol and found that it meets exempt approval under the category designated below for the following period: **09/12/2006 - 09/11/2007**

Any research involving surveys, interviews, or observation of children is not eligible for exempt review, unless it consists only of observational research where the investigator(s) do not participate in the activities being observed. Research that is FDA regulated cannot be granted an exemption except for category 6. (Research is FDA-regulated when it involves the use of a drug or medical device, other than the use of an approved drug or medical device in the course of medical practice, or when the results are to be submitted to or held for inspection by the FDA.) Unless otherwise required by Department or Agency heads, exempt research must fall within one of the following categories:

 1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:

- (i) research on regular and special education instructional strategies, or
- (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (iii). The research is not FDA-regulated

 x 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:

- (i.) Information obtained is recorded in such a manner that human subjects can be identified, directly or through

- identifiers linked to the subjects: and
- (ii.) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, or reputation; or
 - (iii.) The research involves surveys, interviews, or observation of children (where the investigator does not participate in the activities being observed);
 - (iv.) The research is not FDA-regulated

___ 3. Research involving the use of educational tests, survey or interview procedures, or observing public behavior that is not exempt under number 2 above, if the subjects are public officials or candidates for public office or a federal statute requires that the confidentiality of personally identifiable information will be maintained throughout the research and thereafter. The research is not FDA-regulated

___ 4. Research involving the collection or study of existing data, documents, records, pathological or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, either directly or through identifiers linked to the subjects. To qualify for exemption, the data, documents, records or specimens must be in existence before the project begins. The research is not FDA-regulated

___ 5. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate; or otherwise examine:

- i. Public benefit or service programs;
- ii. Procedures for obtaining benefits or services under those programs;
- iii. Possible changes in-or alternatives to those programs or procedures; or
- iv. Possible changes in methods or levels of payment for benefits or services under those programs.
- v. The program under study must deliver a public benefit (e.g., financial or medical benefits as provided under the Social Security Act or service (e.g., social, supportive, or nutrition services as provided under the Older Americans Act).
- vi. The research or demonstration project must be conducted pursuant to specific federal statutory authority;
- vii. There must be no statutory requirement that an IRB review the project;
- viii. The project must not involve significant physical invasions or intrusions upon the privacy of participants;
- ix. The funding agency must authorize or concur with this exemption.
- x. The research is not FDA-regulated

___ 6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

___ Please use the attached approved consent forms

___ ☒ Waiver of Documentation of Consent

___ Waiver of Informed Consent

**RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR FOR ONGOING
PROTOCOLS:**

- (1) Report immediately to the IRB any unanticipated problems.
- (2) Proposed changes in approved research during the period for which IRB approval cannot be initiated without IRB review and approval, except when necessary to eliminate apparent immediate hazards to participant. Changes in approved research initiated without IRB review and approval to eliminate apparent immediate hazards to the participant must be promptly reported to the IRB, and reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the participants continued welfare.
- (3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.
- (4) Insure that only persons formally approved by the DRC enroll subjects.
- (5) If relevant to your study, please use only a currently approved consent form (remember approval periods are for 12 months or less).
- (6) Protect the privacy and confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information.
- (7) Submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change.
- (8) Please note that this office will send out a reminder prior to the end of your approval period (typically at the end of the 12 months). At this time we will ask you to give us an update on whether the study is still in progress and/or has had any changes that need to be reviewed for approval.
- (9) Notify the IRB and the DRC when the study has been completed and complete the Final Report Form.
- (10) Please help us help you by including the above protocol number on all future correspondence relating to this protocol.

Thank you for your help in this matter.

Sincerely,



Lisa Leiden Ph.D., IRB Chair,
Director of the Office of Research, Support, & Compliance

APPENDIX F: IRB APPROVAL FOR IMPLEMENTATION OF THE STUDY



OFFICE OF RESEARCH SUPPORT & COMPLIANCE

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, TX 78713 (512) 471-8871 - FAX (512) 471-8873
North Office Building A, Suite 5.200 (Mail Code A3200)

FWA # 00002030

Date: **02/06/07**

PI(s): **Mary E Thomas**

Department & Mail Code: **NURSING SCHOOL**

Dear: **Mary E Thomas**

IRB APPROVAL - IRB Protocol # **2006-10-0001**

Title: **Perceptions of Registered Nurses Sanctioned by a Board of Nursing: Individual, Health Care Team, Patient and System Contributions to Error.**

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board has reviewed the above referenced protocol and found that it met approval for the following period of time:

Your amendment has been approved from 02/06/2007 – 01/17/2008

The following requested changes have been approved:

- 1) Change faculty sponsor to Dr. Gayle Acton (remove Dr Houston)
- 2) Send postcard reminder to participants

- X Please use the attached approved informed consent
You have been granted waiver of documentation of informed consent in lieu of verbal consent
You have been granted waiver of informed consent

RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR FOR ONGOING PROTOCOLS:

- (1) Report immediately to the IRB any unanticipated problems.
- (2) Proposed changes in approved research during the period for which IRB approval cannot be initiated without IRB review and approval, except when necessary to eliminate apparent immediate hazards to the participant. Changes in approved research initiated without IRB review and approval initiated to eliminate apparent immediate hazards to the participant must be promptly reported to the IRB, and reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the participants continued welfare.
- (3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.
- (4) Insure that only persons formally approved by the IRB enroll subjects.
- (5) Use only a currently approved consent form (remember approval periods are for 12 months or less).
- (6) Protect the confidentiality of all persons and personally identifiable data, and train your staff

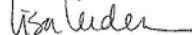
Protocol # 2006-10-0001

Approved from: 01/18/2007 - 01/17/2008

and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information.

- (7) Submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change.*
- (8) Submit a Continuing Review Report for continuing review by the IRB. Federal regulations require IRB review of on-going projects no less than once a year (a Continuing Review Report form and a reminder letter will be sent to you 2 months before your expiration date). Please note however, that if you do not receive a reminder from this office about your upcoming continuing review, it is the primary responsibility of the PI not to exceed the expiration date in collection of any information. Finally, it is the responsibility of the PI to submit the Continuing Review Report before the expiration period.*
- (9) Notify the IRB when the study has been completed and complete the Final Report Form.*
- (10) Please help us help you by including the above protocol number on all future correspondence relating to this protocol. Thank you for your help in this matter.*

Sincerely,



Lisa Leiden, Ph.D., IRB Chair
Director, Office of Research, Support, & Compliance
University of Texas at Austin

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Vita

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